4th International and 23rd National Conference on Environmental Health

2 - 4 March 2021

Yazd-Iran

CONFERENCE PROCEEDING

Conference Proceeding

4th International and 23rd National Conference on Environmental Health

March 2-4, 2021

Yazd- IRAN

Organizers

YAZD Shahid Sadoughi University of Medical Sciences and Health Services

Iranian Association Of Environmental Health (IAEH)

Supporters

- Ministry of Health and Medical Education
- World Health Organization (WHO)
- Iran Department of Environment
- National Water and Wastewater Engineering Co (Iran)
- Yazd Governorate
- Yazd Municipal Waste Management Organization
- Yazd Water and Wastewater Co
- Environmental Sciences and Technologies Research Center (Yazd University of Medical Sciences)

Conference Organization

Chairman

Dr. Mohammad Reza Mirjalili
MD, Internist, Intensivist
The President of Yazd University of Medical Sciences and health Services

Coordinating Secretary

Dr. Mohammad Hassan Ehrampoush
PhD in Environmental Health Engineering
Dean of School of public Health
Shahid Sadoughi University of Medical Sciences and health Services

Scientific Secretary

Dr. Mehdi Mokhatri
PhD in Environmental Health Engineering
Head of Environmental Health Department
Shahid Sadoughi University of Medical Sciences and health Services

Executive Secretary

Dr. Ehsan Abouei
PhD in Environmental Health Engineering
Environmental Health Department, Yazd University of Medical Sciences and health Services

Conference Council

Dr. Alireza Mesdaghinia

Dr. Simin Nasseri

Dr. Kazem Naddafi

Dr. Mohammad Hassan Ehrampoush

Dr. Mehdi Mokhtari

Dr. Mohammad Ali Zazouli

Dr. Mahmood Alimohammadi

Dr. Mazyar Peyda

Dr. Mohammad Reza Mehrasbi

Dr. Mohammad Hoseini

Dr Ehsan Ahmadi

Dr. Mohsen Ansari

Selection Committee of International Speakers

Dr. M. Ali Zazouli

Dr Sina Dobaradaran

Dr. Arash Dalvand

Dr M. Sadegh Hasanvand

Dr Sasan Faridi

Head of International Affairs

Niaz Mahdi Esfahani

Scientific Committee

Dr. Babak	Kakavandi
Dr. Hossein	Kamani
Dr. Homa	Kashani
Dr. Mehran	Khaefi
Dr. Abbas	Khodabakhshi
Dr. Hassan	Khorsandi
Dr. Ali	Koolivand
Dr. Gholamreza	Mahmoudi
Dr. Amir hossein	Mahvi
Dr. Mohammad	Malakootian
Dr. Afshin	Maleki
Dr. Hossein	Masoumbeigi
Dr. Mohammad Hadi	Mehdinejad
Dr. Mohammad Reza	Mehrasbi
Dr. Khalilollah	Moeinian
Dr. Mohammad	Mosaferi
Dr. Gholamreza	Mostafaei
Dr. Gholamreza	Moussavi
Dr. Ramin	Nabizadeh
Dr. Ali Asghar	Najafpoor
Dr. Mahnaz	Nikaeen
Dr. Mohammad	Nourisepehr
Dr. Heshmatollah	Nourmoradi
Dr. Maziar	Peyda
Dr. Meghdad	Pirsaheb
Dr. Alireza	Rahmani
Dr. Reza	Rezaei
Dr. Roshanak	Rezaei
Dr. Mehraban	Sadeghi
Dr. Reza	Saeidi
Dr. Mohammad Hossein	Salmani
Dr. Mohammad Taghi	Samadi
Dr. Mohammad Reza	Samaei
Dr. Mohammad Reza	Samarghandi
Dr. Abdolmotaleb	Seidmohammadi
Dr. Abbas	Shahsavani
Dr. Mansour	Shamsipour
Dr. Fahimeh	Teimori
Dr. Kamyar	Yaghmaeian
Dr. Zeinab	Yavari
Dr. Ahmad	Yazdanbakhsh
Dr. Zabihollah	Yousefi
Dr. Masoud	Yunesian
Dr. Ali	Zafarzadeh
Dr. Mohammad Ali	Zazouli
Dr. Mojtaba	Afsharnia
Dr. Ehsan	Ahmadi
Dr. Mohammad Mehdi	Ahmadi Moghadam
Dr. Nadali	Alavi
Dr. Rahim	Ali
Dr. Hossein	Alidadi
Dr. Morteza	Alighadri
Dr. Mahmood	Alimohammadi
Dr. Vali	Alipour
Dr. Ali	Almasi
Dr. Mohammad Mehdi	Amin
Dr. Hossein	Arfaeinia
Dr. Hossein ali	Asgharnia
Dr. Zahra	Atafar
Dr. Ali Akbar	Babaei
Dr. Mohammad Mehdi	Baneshi
Dr. Behnam	Barikbin
Dr. Bijan	Bina
Dr. Arash	Dalvand
Dr. Mansooreh	Dehghani
Dr. Mohammad Reza	Dehghani
Dr. Emad	Dehghani Fard
Dr. Sina	Dobaradaran
Dr. Ali Asghar	Ebrahimi
Dr. Afshin	Ebrahimi
Dr. Akbar	Eslami
Dr. Hadi	Eslami
Dr. Mohammad	Fahiminia
Dr. Mohsen	Farhadi
Dr. Sasan	Faridi
Dr. Mehrdad	Farokhi
Dr. Mahdi	Farzadkia
Dr. Reza	Fouladi Fard
Dr. Kamal	Ghadiri
Dr. Mohammad Taghi	Ghaneian
Dr. Ghader	Ghanizadeh
Dr. Mitra	Gholami
Dr. Mahdi	Ghorabanian
Dr. Mehdi	Hadi
Dr. Yaghoub	Hajizadeh
Dr. Mohammad Sadegh	Hassanvand
Dr. Mohsen	Heidari
Dr. Mohammad	Hosseini
Dr. Nematollah	Jafarzadeh
Dr. Ahmad	Joneidi

Executive Committee

Secretariat Office: *Fatemeh Babaei - Maryam Zare*

Graphics and Cliparts: *Mohammad Rezavani*

Website Manager: *Moein Khalooee*

Secretariat Experts: *Maryam Hashemkhani -Zahra Soltanianzadeh- Fereshteh Molavi – Ala Arsham - Mohammad Mehalian – Maryam Khasheej - Neda Jalili - Maryam Gholami -Meysam Maharati – Maryam Shamsaei- Mahla Mazlomian - Arman Zamaninia - Hasan Pasalari - Nilofar Borhani - Masoumeh Khatebasreh - Mohadeseh Dehghan - Firozeh Janghorban - Roya Malekahmadi*

IT Committee: *Mohammadreza Khajeaminian - Mohammad Reza Karimi - Mohammad Sadegh Zare - Seyed Ali Fatemi - Alireza Fallahzadeh - Seyed Abdolkarim Ghorashi - Mohammad Kazem Rezania - Ali Savabi*

Coordinating Manager: *Mehdi Sarlak*

Audio Visual Committee: *Iman Moeininasab - Zahra Ebrahimrad*

Public Relation Committee: *Ibrahim Salmani – Somayeh Yousefi- Zahra Fathi – Kimia Eskandari – Zahra Modara - Faezeh Shojaeifar*

Layout Designer: *Fatemeh Dashti Rahmatabadi*

Forienign Language Committee: *Maryam Nikfard- Zara Sadeghian- Hamideh Behroueian*

Conference Topics

1. ***The Role of Environmental Health in Epidemics Prevention and Control (with emphasis on COVID-19)***
2. ***Burden of Diseases Assessment Caused by Environmental Risk Factors***
3. ***Environmental Health; Past, Present and Future***
4. ***Environmental Health; Public education and Social Responsibility***
5. ***Environmental Health Indicators***
6. ***Entrepreneurship and Commercialization of Services in Environmental Health***
7. ***Environmental Pollution Control New Technologies***
8. ***Environmental Pollutants Biomonitoring***

The Conference Secretariat has no responsibility towards the possible errors in composition of the abstracts

4th International and 23rd National Conference on Environmental Health

4th International and 23rd National Conference on Environmental Health
2 - 4 March 2021
Yazd-Iran

keynote speakers

Prof. Jörg Spitz
Founder and Director of the German Academy of Human Medicine, Germany

Prof. Susana Paixão
The International Federation of Environmental Health President, Portugal

Prof. Amir Hossein Mahvi
Department of Environmental Health Engineering, Tehran University of Medical Sciences

Prof. Frank J Kelly
Deputy Director, MRC Centre for Environment and Health, Imperial College London

Prof. Michal Krzyzanowski
London's King College Environmental Research Center, England

Prof. Ravi Naidu
Head of the Global Center for Environmental Rehabilitation, Australia

Prof. Torsten C. Schmidt
President of the German Aquatic Chemistry Association, Germany

Prof. Mohammad Mosaferi
Health and Environment Research Center, Tabriz University of Medical Sciences

Dr. Cheng Yan
China University of Earth Sciences

Prof. Kazem Nadafi
Institute for Environmental Research, Tehran University of Medical Sciences

Prof. Farid Moore
Department of Geology, Shiraz University

Dr. Mohammad Sadegh Hassanvand
Institute for Environmental Research, Tehran University of Medical Sciences

Prof. Andrea Niemann
University of Duisburg, Germany

+98(35)31492268
+989101517424

Join webinar
https://www.skyroom.online/ch/sph/ehconference
www. ehconference.ir

4th International and 23rd National Conference on Environmental Health

Tuesday, March 2, 2021

Opening Ceremony 8:15 – 9:30 am

Session 1: The role of environmental health in the prevention and control of epidemics (with emphasis on Covid-19) 10:00 – 12:00 am

Panel Members: Dr Alireza Mesdaghinia - Dr Masoud Younesian- Dr A.H Mahvi - Dr Mitra Gholami - Dr Sina Dobaradaran –Dr Mohsen Farhadi

Speakers	Title	time
Jörg Spitz	Vitamin D and Covid-19 disease	10 – 10:20 am
Yadollah Ghafouri	Environmental Contamination and Exposure Risk of SARS-CoV-2 in the healthcare	10:25 – 10:35 am
Zahra Shamsizadeh	Detection of antibiotic resistant genes in Escherichia coli isolates, isolated from municipal wastewater treatment plant effluent	10:40 – 10:50 am
Abbas Mirzaei	A systematic review of COVID-19 (SARS-CoV-2) pandemic: Focus on Environmental survival and possible airborne transmission	10:55 – 11:10 am
Amir hossein Mahvi	Wastewater based epidemiological studies on COVID-19	11:15 – 11:30 am
Panelists	Q&A	11:40 – 12:00 am

4th International and 23rd National Conference on Environmental Health

Session 2: Environmental Pollution Control Technologies 01:00 – 03:00 pm

Panel Members: Dr Simin Nasseri - Dr M.A Zazouli - Dr M.M Amin - Dr Roshanak Rezaei - Dr G. Moosavi - Dr N.A Alavi - Dr Arash Dalvand

Speakers	Title	time
Andrea Niemann	Strategies and Technologies for emerging pollutants treatment	01:00 – 01:20 pm
Torsten C. Schmidt	Water analysis using objective, suspicious, non-objective analysis: what should be done by all the data?	01:25 – 01:45 pm
Salimeh Rezeinia	Predicting greenhouse gas emissions and energy recovery potential from waste landfills in Yazd, Iran	01:50 – 02:00 pm
Hossein Mansourian	Evaluation of the performance of MFC-MEC coupled system with Graphite felt / MWCNTs nanocomposite electrode in landfill leachate treatment and electricity and biogas production	02:05 – 02:15 pm
Negar Jaafari	Photocatalytic degradation of Microcystin-LR by TiO2/Zeolite nanocomposite from aqueous solutions	02:20 – 02:30 pm
Ali Abdolahnejad	Performance of photoreactor on the biofiltration of n-hexane vapours from the polluted air stream	02:35 – 02:45 pm
Panelists	Q&A	02:45 – 03:00 pm

Wednesday, March 3, 2021

Session 3: Environmental Health Indicators 08:00 – 09:45 am

Panel Members: Dr Ahamad Joneidi - Dr K. Yaghmaeian - Dr Ali Almasi - Dr A.A Najafpour - Dr M.T. Samadi - Dr Afshin Maleki - Dr A.A Ebrahimi

Speakers	Title	time
Mohammad Maroosi	Development of Iranian environmental health quality index based on causal model	08:00 – 08:10 am
Sepideh Sadeghi	Investigation of compost's microbial population from municipal solid waste (MSW) and comparison with standard values	08:15 – 08:25 am
Hamid Karyab	Monitoring the content of heavy metals in special industrial wastes and soils around industrial areas: by a health and environmental risk assessment approach	08:30 – 08:40 am
Reza Dehbandi	Investigation of the microplastics presence in the Talar and Tajan rivers sediments in Mazandaran province	08:45 – 08:55 am
Farzad Fanaei	Characteristics, emission sources and risk assessment of heavy metals bonded with 2.5 micron particles in the most industrial city in Iran	09:00 – 09:10 am
---------	Will be announced later	09:15 – 09:30 am
Panelists	Q&A	09:30 – 09:45am

4th International and 23rd National Conference on Environmental Health

Session 4: Assessing the burden of diseases caused by environmental risk factors 10:00- 12:00 am

Panel Members: Dr M.S Hasanvand - Dr Akbar Eslami - Dr Abbas Shahsavani - Dr Homa Kashani - Dr Reza Saeedi- Dr Fahime Teymouri

Speakers	Title	time
Mohammad Sadegh Hassanvand	The environmental risk factors accounts for burden of diseases in Iran	10:00 – 10:20 am
Mahmoud Alimohammadi	Investigation COVID-19 virus presence in raw and treated municipal wastewater in Tehran, Bandar Anzali and Qom	10:25 – 10:35 am
Sepideh Tousizadeh	Investigation of the relationship between genetic polymorphisms in GSTM1 and GSTT1 genes and susceptibility to lung functional abnormalities in workers exposed to air pollutants at Isfahan Steel Plant	10:40 – 10:50 am
Mansour Shamsipour	Determining the burden of non-communicable diseases attributed to traffic noise in Tehran metropolis	10:55 – 11:05 am
Mehrnoush Abtahi	Investigation of the burden of diseases attributed to high concentrations of fluoride in drinking water in the country (Iran) in 2017	11:10 – 11:20 am
Panelists	Q&A	11:25 – 12:00am

Session 5: Entrepreneurship, Employment and Commercialization of Environmental Health Services ; 01:00 – 03:00 pm

Panel Members: Dr M.T Ghaneian - Dr H. Vatanpor - Dr Kazem Naddafi- Dr Ahamad Joneidi - Dr Gholamreza Mahmoudi – Ali Gourani

Speakers	Title	time
Hossein Vatanpour	Infrastructure, achievements and experiences of technology development In the field of environmental health	01:00 – 01:20 pm
Gholamreza Mahmoudi Kondori	Entrepreneurial universities, Limitations and Necessities	01:20 – 01:40 pm
Ali Gourani	Increase credibility and wealth creation in environmental health engineering	01:40 – 02:00 pm
	Discussion Panel attended by the panelists and participants	02:00 – 03:00 pm

Presenting Tweezers (technological plans and ideas) **04:30 – 06:00 pm**

+98(35)31492268
+989101517424

Join webinar
https://www.skyroom.online/ch/sph/ehconference
www. ehconference.ir

4th International and 23rd National Conference on Environmental Health
2 - 4 March 2021
Yazd-Iran

Thursday, March 4, 2021

Session 6: Environmental Pollutants Biomonitoring 08:00 – 09:30 am

Panel Members: Dr N. Jafarzadeh - Dr Ramin Nabizadeh - Dr M. Farzadkia - Dr M.R Mehrasbi - Dr A. Rahmani - Dr Mehrdad Farrokhi

Speakers	Title	time
Majid Hashemi	Development of a new method for the identification and measurement of the three major metabolites of di (2-ethylhexyl) phthalate in human urine samples using liquid-liquid micro-extraction and gas chromatography-mass spectrometry (Case study: urine samples of children and adolescents)	08:05 – 08:15 am
Ghasem Kiani	An Analysis of Urinary Concentration of Parabens in Iranian Adolescents and Its Relationship with the Use of Personal Care and food Products	08:20 – 08:30 am
Ehsan Gharehchahi	Measurement and evaluation of health risk due to exposure to BTEX in municipal wastewater treatment plant staff, Shiraz, Iran	08:35 – 08:45 am
Farid More	Integrated sciences and public health	08:50 – 09:10 am
Ashraf Mazaheri	Exposure to bioaerosols and its association with inflammatory biomarkers and blood parameters in waste management workers	09:15 – 09:25 am
Fatemeh Zakieh Tohidi	Monitoring changes in gene expression levels caused by telecommunication antenna waves	09:30 – 09:40 am
Panelists	Q & A	09:40 – 09:50 am

Session 7: Environmental Health; Past, present and future
Environmental Health; Public education and social responsibility 10:00 am - 12:15 pm

Panel Members: Dr Kazem Naddafi - Dr A.R Yazdanbakhsh - Dr M. Malakoutian - Dr Z. Yousefi - Dr M. Alimohammadi - Dr M. Hoseini

Speakers	Title	time
Michal Krzyzanowski	Environmental Health from past to future	10:05 – 10:20 am
Susana Paixão	Environmental health perspective in the world	10:25 – 10:40 am
Frank J Kelly	London's Air Pollution Story: From pea soup smog to an ultra-low emission city'	10:45 – 11:00 am
Ravi Naidu	Clean Earth: humanity's next great challenge	11:05 – 11:20 am
Mohammad Mosaferi	Environmental health foresight in Iran and the need to review the educational content in order to meet the needs ahead	11:25 – 11:40 am
Kazem Naddafi	The Future of the Environmental Health Profession and our Responsibility	11:40 – 12:00 am
Panelists	Q & A	12:00 – 12:15 pm

Closing Ceremony 01:30 – 02:30 pm

Title
Announcement of the best papers of the conference

Burden of Diseases Assessment Caused by Environmental Risk Factors

Presentations

Age-Sex Specific Disability-Adjusted Life Years attributable to Elevated Levels of Fluoride in Drinking Water: A National and Subnational Study in Iran, 2017

Mehrnoosh Abtahi [a,b], Sina Dobaradaran[c,d,e], Sahand Jorfi[f,g], Ali Koolivand[h], Shokooh Sadat Khaloo[i,j], Najmeh Golchinpour[k], Reza Saeedi[i,j*]

[a] Department of Environmental Health Engineering, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[b] Environmental and Occupational Hazards Control Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[c] Systems Environmental Health and Energy Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, Iran
[d] Department of Environmental Health Engineering, Faculty of Health, Bushehr University of Medical Sciences, Bushehr, Iran
[e] The Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, Iran
[f] Environmental Technology Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[g] Department of Environmental Health Engineering, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[h] Department of Environmental Health Engineering, Faculty of Health, Arak University of Medical Sciences, Arak, Iran
[I] Workplace Health Promotion Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[j] School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[k] MSc graduate, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

[*]**Corresponding author.** Tel: (+98 21) 77309961; Fax: (+98 21) 77302969; Email address: r.saeedi@sbmu.ac.ir (Reza Saeedi)

Abstract

National and subnational burden of disease attributable to elevated fluoride levels in drinking water apportioned by sex, age group, province, and community type in Iran, 2017 were quantified based on disability-adjusted life years (DALYs). The burden of disease was estimated using four input data: (1) effect size of elevated drinking water fluoride levels for dental and skeletal fluorosis, (2) population distribution of drinking water fluoride levels, (3) the threshold levels of fluoride in drinking water for contribution in dental and skeletal fluorosis, and (4) age-sex distribution of population. The disease burden was only related to dental fluorosis, because the fluoride levels were lower than the threshold value for skeletal fluorosis (4.0 mg/L) in all of the cases. The national attributable prevalence (per 100,000 people), DALYs, and DALY rate in 2017 were calculated to be 60 (95% uncertainty interval 48-69), 3443 (1034-6940), and 4.31 (1.29-8.68), respectively. The national attributable burden of disease was not significantly different by sex, but was affected by age and community type in a manner that the highest DALY rate was related to the age group 10-14 y (6.06 [1.82-12.21]) and over 66% of the national attributable DALYs occurred in rural communities. The attributable burden of disease occurred only in 10 out of 31 provinces and about 94% of the attributable DALYs were concentrated in four provinces Fars (1967 [592-3964]), Bushehr (414 [124-836]), West Azarbaijan (400 [120-808]), and Hormozgan (377 [113-761]). Implementation of fluoride-safe drinking water supply schemes in the four leading provinces can prevent most of the national health losses and partly compensate the increasing trend of disease burden from oral conditions at the national level.

Keywords: Attributable burden of disease; Defluoridation; Dental fluorosis; Elevated fluoride level; Environmental risk factor; Health risk assessment

The Relationship between Polymorphisms in GSTM1 and GSTT1 Genes and Susceptibility to Pulmonary Dysfunction in Steel Factory Workers Exposed to Air Pollution

SepidehTousizadeh[*1]Mansoor Salehi[1], Fazel Mohammadi Moghadam[2], Behnaz Tousizadeh[2] Sara Hemati[3]

[*1]Department of Environmental Health Engineering, Faculty of Health, Shahrekord University of Medical Sciences, Shahrekord , Iran: Sepidehtousizadeh@gmail.com
[1] Cellular, Molecular and Genetics Research Center, Isfahan University of Medical Sciences, Isfahan, Iran: m_salehi@med.mui.ac.ir
[2]Department of Environmental Health Engineering, Faculty of Health, Shahrekord University of Medical Sciences, Shahrekord , Iran: Fazel.health@gmail.com
[2]Department of Microbiology, Faculty of Basic Sciences, Ayatollah Amoli Azad University, Amol, Iran: behnaztousizadeh@gmail.com
[3]Department of Environmental Health Engineering, Faculty of Health, Shahrekord University of Medical Sciences, Shahrekord , Iran: hemati.sara88@yahoo.com

***Corresponding author:** Sepidehtousizadeh@gmail.com

Abstract

Epidemiological studies have demonstrated that increased concentrations of toxic gases and irrespirable suspended particulates in the air, increase respiratory symptoms. Individual reactions to these substances depend on pollutant type, degree of exposure, individual health, and genetic background. Toxic gases cause oxidative stress which induces lung inflammation and subsequent lung injuries. Glutathione S- transferases (GSTs) are a family of enzymes that play an important role in intracellular detoxification processes. The GST gene polymorphism is involved in many disease states such as lung disorders (1). Gene deletions in GSTM1 and GSTT1 lead to development of alleles which stop production of active enzymes. In this study, a sample of 41 steel factory workers with impaired lung function have been selected (2). Multiplex PCR technique was used to identify the genotyping of enzymes glutathione S-transferase M1 and T1 (3). Our results demonstrate that the frequency of homozygous deletion in 41 patients (24.30 %), of 10 patients with homozygous deletion GSTM1 alone (9.7 %), 4 persons GSTT1 homozygous deletion alone (53.60 %) of 22 patients combined with homozygous deletion of GSTM1 and GSTT1 (12 %) of 5 patients without homozygous deletion and homozygous deletion frequency among 50 healthy individuals (controls) as well (16 %) of 8 patients with homozygous deletion GSTM1 alone (24 %) 12 individuals with GSTT1 homozygous deletion alone (46 %) of 23 patients with combined GSTM1 and GSTT1 homozygous deletion (14 %) of 7 patients without homozygous deletion was also the result of chi-square test between the two groups of patients and healthy subjects. In conclusion, these genotypes cannot be used for prevention of lung dysfunction in susceptible individuals (4).

Key word: Lung dysfunction, GSTT1, GSTM1, Polymorphism, Pollutants

Burden of Non-Communicable Disease attributed to Road Traffic Noise; A Quantification of Healthy Life Years Lost in Tehran, Iran

Mansour Shamsipour[1*], Narges Zaredar [2], Mohammad Reza Monazzam [3]

1 Department of Research Methodology and Data Analysis, Institute for Environmental Research (IER), Tehran University of Medical Sciences.
2 Ph.D. in Environmental Sciences, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran
3 Department of Occupational Hygiene, School of Public Health and Center for Air Pollution Research (CAPR), Institute for Environmental Research (IER), Tehran University of Medical Sciences, Tehran, Iran

***Corresponding author:** E-mail address: shamsipour@sina.tums.ac.ir

Abstract

Introduction: This study was conducted in 2017 with the aim of estimating the burden of non-communicable diseases attributed to traffic noise (as the main source of environmental noise) in the metropolitan city of Tehran.

Methodology: The number of DALYs (Disability Adjusted Life Years) lost due to these outcomes, including severe sleep disturbance, noise annoyance, ischemic heart disease, hypertension, and stroke that could be attributed to environmental noise, was estimated. In the present study, the methodology recommended by the World Health Organization and other valid studies in this field was used. After estimating the population of Tehran in 2017, the exposure of the city residents to different sound levels was estimated and the percentage of the population exposed to each of the sound levels was calculated. In the next step, using the most up-to-date exposure-response functions available in review articles and international guidelines, the population fraction contribution (PAF) of each of the health outcomes was calculated. For the outcomes of ischemic heart disease, stroke, and hypertension, the of DALY rate were adopted from the Global Burden of Disease, 2017. Finally, the number of DALYs caused by each of the diseases attributable to environmental noise was calculated.

Results: According to the classified Ldn map, the southern and central parts of Tehran are faced with higher levels of environmental noise round-the-clock. In total, the number of DALYs attributed to traffic noise in Tehran in 2017 was estimated at 61284 years. Severe sleep disorders with a share of 58.74% of these lost years account for the highest burden of diseases caused by environmental noise. The noise-induced annoyance with a share if 23.12% of the total burden of diseases attributed to environmental noise places in the second rank. Ischemic heart disease (11.71%), stroke (5.12%), and hypertension (1.31%) are ranked third to fourth, respectively, in terms of the burden of disease attributable to environmental noise.

Conclusion: In general, the results showed that environmental noise with a DALY rate of 697 per 100,000 people has a significant contribution to the development of non-communicable diseases and should be given more attention. In line with the findings of other similar studies, the results showed that 60% of the total burden of diseases from environmental noise is attributed to severe sleep disturbance and 30% to noise annoyance. It can be concluded that traffic noise pollution mainly imposes the greatest burden on society through these two consequences and therefore, they should be considered as one of the leading consequences related to traffic noise pollution and taken into account in the relevant plans.

The First Evidence for the Presence of SARS-CoV-2 RNA in Untreated and Treated Wastewater in Middle Eastern Cities (Tehran, Qom and Anzali: Iran) during Coronavirus Disease 2019 (COVID-19) Outbreak

Simin Nasseri[1], Jila Yavarian[2], Talat Mokhtari Azad[3], Ahmad Nejati[4], Ramin Nabizadeh[5], Mahdi Hadi[6], Abbas Norouzian Baghani[7], Nazanin Zahra Shafiei Jandaghi[8], Behnam Vakili[9], Seyed Koushyar Azam Vaghefi[10], Mahtab Baghban[11], Somayeh Yousefi[12], Shahrokh Nazmara[13], Mahmood Alimohammadi[14*], Esfandiar Ghorduei Milan[15]

[1] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (naserise@tums.ac.ir)
[2] Department of Virology, School of Public Health, Tehran University of Medical Sciences (yavarian@tums.ac.ir)
[3] Department of Virology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (Mokhtari@sina.tums.ac.ir)
[4] Department of Virology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (nejati_ahmad@yahoo.com)
[5] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (Rnabizadeh@gmail.com)
[6] Center for Water Quality Research (CWQR), Institute for Environmental Research (IER), Tehran University of Medical Sciences, Tehran, Iran (hadi_rfm@yahoo.com)
[7] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (abbas.jj.norozi@gmail.com)
[8] Department of Virology, School of Public Health, Tehran University of Medical Sciences (NZ_shafiei@tums.ac.ir)
[9] Office of Improvement on Wastewater Operation Procedures, National Water and Wastewater Engineering Company, Tehran, Iran (vakili@nww.ir)
[10] Manager of Water Quality Control Bureau, National Water And Wastewater Eng. Co (vaghefi[@]nww.ir)
[11] Nanotechnology Research Centre, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran (baghebanm@razi.tums.ac.ir)
[12] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (Syousefi852@gmail.com)
[13] Department of Environmental Health, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (snazmara@gmail.com)
[15] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (esfandiarmilan@gmail.com)

***Corresponding author:** Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (m_alimohammadi@tums.ac.ir)

Abstract

This study describes the presence of SARS-CoV-2 RNA in raw and treated wastewater during coronavirus disease 2019 (COVID-19) outbreak in Tehran, Qom, and Anzali (Iran).

Methodology: As there were three wastewater treatment plants (WWTPs) (i.e., Southern Tehran WWTP, East Anzali WWTP and Qom WWTP No. 3), we collected 28 total treated and untreated wastewater grab samples altogether between on April 4, 2020 and on May 2, 2020.

Results: In the current study, SARS-CoV-2 RNA was elicited from wastewater grab samples in inlets and outlets of three WWTPs using polyethylene glycol 8000 (PEG 8000) and an RNA virus was detected by one-step real-time quantitative reverse transcriptase-polymerase chain reaction (qRT-PCR) resulting in twelve and two positive detections from twelve inlets and sixteen outlets samples within a thirty-day period from WWTPs, respectively. The results of outlet samples of Southern Tehran WWTP described that ultraviolet (UV) disinfection was more effective than chlorine disinfection and for effective disinfection, WWTP operator should be increased the concentration of free residual chlorine greater than or equal to 0.5 mg/L at retention time (RT) thirty minutes at pH lower than eight based on World Health Organization (WHO) on March 03, 2020. In addition, as the removal efficiency of parameters such as BOD_5, COD, and SS in East Anzali WWTP and Qom WWTP No. 3 increases, so does the efficiency of SARS-CoV-2 RNA removal. **Conclusion**: Generally, we can be concluded that wastewater treatment facility can be the main sources of SARS-CoV-2 and can be transmitted SARS-CoV-2 via air (aerosol transmission). As a result, it can threaten the health of workers at WWTPs during sludge production, transportation, and disposal, residents living near to the treatment plants and even entire communities. The results of this work have broad implications for other regions owing to the pervasiveness of COVID-19.

Keywords: Wastewater treatment plant; COVID-19; SARS-CoV-2 RNA; chlorine disinfection; BOD_5

Burden of Diseases Assessment Caused by Environmental Risk Factors

Posters

Risk Assessment of Pesticides in Agriculture Farms Jiroft City and Effect of Drinking Water Resources using Arc-GIS Software

Mahsa Tahergorabi[a*], Mohammad Malakootian[b,c], Samaneh Dehghan[d] Majid Kermani[e,f], Fatemeh Eslami[g], Akbar Esfandyari[h], Farzad Fanaei[i], Mahnaz Ghambarian[j],

[a] Department of Environmental Health Engineering, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran, Tel.+989124359726; email: tahergorabi.m@gmail.com
[b] Department of Environmental Health, School of public Health, Kerman University of Medical Science, Kerman, Iran. Tel. +98 9131401536; email: m.malakootian@yahoo.com
[c] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran.
[d] Department of Environmental Health Engineering, School of Health, Mazandaran University of Medical Sciences, Mazandaran, Iran, Tel.+989117177356; email: Sdehghan2010@gmail.com
[e] Department of Environmental Health Engineering, School of public Health, Iran University of Medical Sciences, Tehran, Iran. Tel. +98 9122250387; email: majidkermani@yahoo.com
[f] Research Center for Environmental Health Technology, Iran University of Medical Sciences, Iran
[g] Department of Environmental Health Engineering, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran, Tel.+989136397327; email: fatemeh.eslami6397327@gmail.com
[h] MSc student, Department of Environmental health Engineering, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran, Tel. +989131492134; email:a.esfandyari1393@gmail.com
[I] MSc student, Department of Environmental health Engineering, School of Public Health, Iran University of Medical Sciences, Iran, Tehran, Tel. +989016457815; email: farzadfanaei37@gmail.com
[j] Iranian Research and Development Center for Chemical Industries, ACECR, Tehran, Iran, Tel.+989123048038; email:ghambarian.m@gmail.com

***Corresponding author:** E-mail: tahergorabi.m@gmail.com, Tel.: +98 9124359726

Abstract

Introduction: Almost 40% of all insecticides that are used in agriculture are in the form of organophosphate. Insecticides are the most economic pest control materials due to their rapid effects. However, they have disadvantages including adverse effects on non-target organisms, toxic residue in agricultural products, soil, and water, as well as acute and chronic food poisoning. Water pollution with insecticides is one of the major challenges in environmental protection. Organophosphate toxins exist in many agricultural commodities which may enter the food chain. As a result, they are considered as a risk factor for human health through contaminated food and water consumption.

Materials and Methods: In this experiment 15 samples were collected from the wells in Jiroft, Kerman. Then, the samples were tested using GC/MS. The average concentrations of organophosphate insecticides (Malathion, Parathion, and Dichlorvos) were recorded and the distance among the aquifers were plugged in the calculation of concentration changes of the insecticides. In addition, health risk assessments were conducted for children and adolescents according to the environmental protection agency's standards. The results were calculated using an Excel sheet.

Results: The average concentrations of Malathion (1.13 µg/l), Parathion (1.06 µg/l) and Dichlorvos (1.1 µg/l) were higher than the allowable concentrations set by Australian standards. Non-carcinogenic risk index for adolescent was 0.63 and for children was 1.21. The average risk of Dichlorvos carcinogenic risk in both children and adolescent was 5.2×10^{-5} and the ELCR level was in the acceptable range.

Conclusions: According to these results, there is a significant risk of non-carcinogenic diseases for children. Therefore, it is important to monitor the drinking water resources adjacent to the agricultural farms. In addition, it is necessary to enforce the law in the region to improve the water quality.

Keywords: Organophosphate toxin, Risk assessment, Non-carcinogenic, Carcinogenic, Groundwater

Assessment of the Level of Spiritual Health in the Corona Epidemic in a Private Hospital in 2020

Hadi Alimoradi [1], Mahsa Nazari [2], Alireza Ajdani [3], Reza Jafari Nodooshan [4]

[1] Master of Occupational Health Engineering, Occupational Health Research Center, School of Public health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Master of Occupational Health Engineering, Occupational Health Research Center, School of Public health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. *Corresponding author:nazarimahsa95@yahoo.com
[3] Doctor of Medicine, Isfahan University of Medical Sciences
[4] Assistant Professor and Faculty of Occupational Health Engineering, Department of Occupational Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

Abstract

Introduction: Issues related to spirituality are considered as one of the essential components in the experience of chronic and viral diseases, so that they can seriously affect people's view of themselves, illness, and the future. The aim of this study was to investigate the spiritual health of patients with coronary heart disease and its relationship with general health.

Methods: This cross-sectional correlational study was performed on 567 patients with new coronavirus at least 24 years old in Isfahan Private Hospital in 2016. Patients' spiritual health was assessed using Paloutzian Ellison questionnaire (1982) and general health questionnaire (GHQ-28). Descriptive statistics, independent t-test, and Pearson correlation coefficient were used to analyze the data by SPSS 19 software.

Results: The results showed a direct relationship between general health and spiritual health, which was statistically significant ($p = 0.003$, $r = 0.71$) and also between spiritual health in the religious sector ($p = 0.01$, $r = 0.54$). Existential part ($p = 0.001$, $r = 0.68$)

Conclusion: Based on the results of the present study, many patients with coronary artery had high spiritual health, which makes the patient more compatible with his disease.

Keywords: Corona, Viral disease, Spiritual health, General health, Respiratory syndrome

Short and Long-Term Variations of $PM_{2.5}$ and its Health Effects in one of the Most Polluted Central Cities of Iran

Negar Jafari [1], Farzad Fanaei [2], Yaghoub Hajizadeh[1], Amir Mohammadi [3], Ali Behnami [3], Sepideh Nemati [4], Mojtaba Pourakbar [3], Ali Abdolahnejad [3]*

1 Department of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran. Email address: n64jafari@gmail.com, y_hajizadeh@hlth.mui.ac.ir
2 epartment of Environmental Health Engineering, Iran University of Medical Sciences, Tehran, Iran. Email address: farzadfanaei37@gmail.com
3 Department of Environmental Health Engineering, Maragheh University of Medical Sciences, Maragheh, Iran. Email address: amahammadi@gmail.com, ali.behnami64@gmail.com, Ppourakbar@yahoo.com, abdolahnejad.a@gmail.com
4 Department of Environmental Health Engineering, Tabriz University of Medical Sciences, Tabriz, Iran. Email address: nemati.sepid@gmail.com

***Corresponding author:** Ali Abdolahnejad, Email address: abdolahnejad.a@gmail.com

Abstract

Isfahan is one of the most important industrial cities in central Iran that air pollution has been the biggest challenge of this city in recent years. So, the aim of present study was to survey the spatial and temporal trends of ambient $PM_{2.5}$ and to estimate their health effect on Isfahan citizens from 2014-2019 using the AirQ+ software. The results showed that the annual mean concentration of $PM_{2.5}$ during study period was 3-5 times higher than the WHO guideline (10 µg/m^3). The data showed that people in almost 58-96% of the days of a year were exposed to $PM_{2.5}$ higher than the WHO daily guideline. The concentrations of $PM_{2.5}$ in cold months were higher than those in the other months. The zoning of the annual $PM_{2.5}$ concentrations with GIS showed that the highest $PM_{2.5}$ concentrations were related to the northern, northwestern, southern, and central areas of the city. The present study estimated that on average 14% of the total mortality, 17% of lung cancer (LC), 15% of chronic obstructive pulmonary disease (COPD), 17% of ischemic heart disease (IHD), and 15% of stroke mortalities were related to long-term exposure to ambient $PM_{2.5}$. So, provincial managers and politicians should adopt appropriate strategies to control air pollution and reduce its consequent health effects and economic losses.

Keywords: $PM_{2.5}$, AirQ+ software, Health effect, Isfahan

Long-term Health Effects Assessment of Exposure to Ambient Air PM_{10} by using the AirQ+ in Tabriz City during 2006-2017

Vahideh Barzeghar[1,2], Akbar Gholampour[1,2]*, Mohammad sadeg Hassanvand[3], Sasan faridi[4]

[1]Health and Environment Research Center, Tabriz University of Medical Sciences, Tabriz, Iran. (vahideh.barzegar@gmail.com)(ak.golampour@gmail.com)
[2]Department of Environmental Health Engineering, School of Public Health, Tabriz University of Medical Sciences, Tabriz, Iran (vahideh.barzegar@gmail.com)(ak.golampour@gmail.com)
[3]Center for Air Pollution Research (CAPR), Institute for Environmental Research (IER), Tehran University of Medical Sciences, Tehran, Iran.(mshasanvand@gmail.com)
[4]Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.(sasanfaridi67@gmail.com)

***Corresponding author:** Akbar Gholampour (ak.golampour@gmail.com)

Abstract

Global Burden of Disease (GBD) study revealed ambient particulate matter and household air pollution were the 6th and 8th largest contributors to global disability-adjusted life-years (DALYs) in 2015. Iran, like many other developing countries, is exposed to severe air pollution problem. The main aim of this study was to evaluate exposure to ambient air PM10 concentrations and its long-term health effects on human health using the World Health Organization (WHO) AirQ+ software updated in 2017 in Tabriz City, during 1385-1396. In order to processing and deletion of outlier data was used from the Z scores method and Cronbach's Alpha test.

According to the results, the annual mean concentrations of PM_{10} was 69.9 and 58.7 µg / m^3 in 1385 and 1396 respectively and maximum value was observed in 1388 with 98.9 µg / m^3, which was higher than that of the WHO-guidelines (20 µg/m3). The results also showed that proportions due to long-term exposure to PM_{10} were 7.9-28.7% for post neonatal infant mortality and 20.7-61.5% for incidence of chronic bronchitis in adults. The Cronbach's Alpha test results, for the PM_{10} concentrations between stations was observed; Abrasan: 0.976, Bagh shomal: 0.983, Hakim nezami: 0.989, Rah ahan: 0.981, Raste kuche: 0.986 respectively.

The resulting of this study could be beneficial for policy makers as it provides precious knowledge about the importance of air pollution and considerable impacts of air pollutants on the population in a society as a key step to reduce the health effects resulting from ambient air pollution.

Keywords: Long-term health effects; ambient air; PM_{10}; AirQ+; Tabriz

Investigating urinary Triclosan concentration and its association with anthropometric parameters in children and adolescents in Kerman, Iran

Habibeh Nasab [1], Moghaddameh mirzaee [2], Karim Ebrahimpour [3], Majid Hashemi [1,4*]

[1] Department of Environmental Health Engineering, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; Email address: nhabibeh1399@gmail.com
[2] Modeling in Health Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran; Email address: moghadameh_mirzai@yahoo.com
[3] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; Email address: k.ebrahim@gmail.com
[4] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran.

***Corresponding author:** Majid Hashemi, Department of Environmental Health Engineering, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; Tel.: +983431325075, Fax: +983431325128; E-mail: mhashemi120@gmail.com; ma.hashemi@kmu.ac.ir

Abstract

Objectives: Triclosan is an antimicrobial and fat-soluble substance. It has been used for over 40 years as an antibacterial and antifungal agent in products such as toothpaste, mouthwash, and personal care products (hand soap, shampoo, deodorant, detergent, cosmetics). Triclosan can affect endocrine function such as thyroid and sex hormone homeostasis. This study aimed to biomonitoring triclosan in urine samples of children and adolescents (6-18 years) in Kerman, Iran, and its relationship with anthropometric parameters.

Methods: The present cross-sectional study was conducted in 2020 on 79 children and adolescents
(6-18 years). The concentration of triclosan was determined by GC/MS and its relationship to anthropometric parameters was investigated. All examinations including height, weight, and waist circumference were measured according to standard protocols.

Results: Triclosan was observed in all samples. The mean age of the study population was 11.36±3.81. The geometric mean concentration of triclosan (µg/g.cr) in girls in the age group of 6-11 years was higher than the age group of 12-18 years (p-value =0.03). A significant positive and strong relationship was observed between triclosan and body mass index (r =0.78, p-value <0.0001). A significant positive correlation was observed between triclosan and BMI z-score (r =0.62, p-value <0.0001). No association was observed between triclosan and waist circumference.

Conclusions: The present study showed a positive relationship between triclosan with BMI z-score and body mass index, which is the main indicator of overweight and obesity in children and adolescents. Since the present study is a cross-sectional study, thus, further research is needed to investigate the effect of triclosan on the health of children and adolescents.

Keywords: Triclosan, endocrine-disrupting chemicals, body mass index, children and adolescents

Effect of Ambient Air Pollution on the Adult Asthma Prevalence in Tehran, Iran

Maryam Faraji [1,2,*] Mohammad Reza Fazlollahi [3], Amir Mohammadi [4], Mehdi Najmi [5], Mojtaba Fallahnezhad [6,7], Nastaran Sabetkish [3], Anoshirvan Kazemnejad [8], Raheleh Shokouhi Shoormasti [3], Zahra Pourpak [3], Mostafa Moin [3]

[1] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran
[2] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; m_faraji28@yahoo.com.
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; fazlollahi@tums.ac.ir
[4] Department of Public Health, School of Nursing and Midwifery, Maragheh University of Medical sciences, Maragheh, Iran; amahammadi@gmail.com
[5] Center of Non-communicable Diseases Management, Deputy for health, Ministry of Health and Medical Education, Tehran, Iran; dr_mnajmi@yahoo.com
[6] Razi Science Researchers Institute, Tehran, Iran
[7] Health Department of Zanjan University of Medical Sciences, Zanjan, Iran; atabak76@yahoo.com
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; nastaran.sk@gmail.com
[8] Department of Biostatistics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran; kazem_an@modares.ac.ir
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; raheleh.shokouhi@gmail.com
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; pourpakz@tums.ac.ir
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; mmoin@sina.tums.ac.ir

***Corresponding author:** Maryam Faraji. m.faraji@kmu.ac.ir. m_faraji28@yahoo.com.
Address: Kerman University of Medical Sciences, Medical University Campus, Haft-Bagh Highway, Kerman, Iran. **Postal Code:** 7616913555. **Tel:** (+98-34) 31325103.

Abstract

Asthma is one of the major health problems worldwide. Air pollution is defined as one of the risk factors for asthma. This study aimed to investigate the effects of ambient air pollution on the adult asthma prevalence in Tehran. The prevalence of asthma was surveyed in 3172 adults between 20 and 44 years old in Tehran, Iran. Data were collected through personal interview via a standardized questionnaire [European Community Respiratory Health Survey (ECRHS)]. Concentrations of six air pollutants; CO, O_3, SO_2, NO_2, PM_{10} and $PM_{2.5}$ in the whole city of Tehran were obtained from Tehran Air Quality Control Company (AQCC). Exposure was estimated through GIS. The association between air pollutants concentrations and asthma symptoms was assessed with the logistic regression and reported as odds ratios (OR) with 95% confidence interval (CI). Results of the current study showed that the prevalence of asthma in adults in Tehran was 11.73%, higher than the average prevalence of asthma in the whole country equal to the 8.9%. The prevalence of asthma in males (6.43%, n=204) was significantly higher than females (5.26%, n=167), but this difference was not significant (P = 0.29). A significant positive association was observed between the asthma prevalence and the concentration of CO (OR 1.64; 1.26 to 1.85) and PM10 (1.04; 1.01 to 1.08) (P <0.05). Thus, we concluded that exposure to some air pollutants can affect the asthma prevalence in adults. Therefore, control of air pollution is recommended to reduce the asthma in Tehran metropolis.

Keywords: Air pollution, Asthma, Tehran, Respiratory diseases

Effect of Road Noise on the Adult Asthma Prevalence in Tehran, Iran

Maryam Faraji [1,2,*] Mohammad Reza Fazlollahi [3], Amir Mohammadi [4], Mehdi Najmi [5], Mojtaba Fallahnezhad [6,7], Nastaran Sabetkish [3], Anoshirvan Kazemnejad [8], Raheleh Shokouhi Shoormasti [3], Zahra Pourpak [3], Mostafa Moin [3]

[1] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran
[2] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; m_faraji28@yahoo.com
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; fazlollahi@tums.ac.ir
[4] Department of Public Health, School of Nursing and Midwifery, Maragheh University of Medical sciences, Maragheh, Iran; amahammadi@gmail.com
[5] Center of Non-communicable Diseases Management, Deputy for health, Ministry of Health and Medical Education, Tehran, Iran; dr_mnajmi@yahoo.com
[6] Razi Science Researchers Institute, Tehran, Iran
[7] Health Department of Zanjan University of Medical Sciences, Zanjan, Iran; atabak76@yahoo.com
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; nastaran.sk@gmail.com
[8] Department of Biostatistics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran; kazem_an@modares.ac.ir
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; raheleh.shokouhi@gmail.com
[3] Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; pourpakz@tums.ac.ir
Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran; mmoin@sina.tums.ac.ir

***Corresponding author:** Maryam Faraji. m.faraji@kmu.ac.ir. m_faraji28@yahoo.com.
Address: Kerman University of Medical Sciences, Medical University Campus, Haft-Bagh Highway, Kerman, Iran. **Postal Code:** 7616913555. **Tel:** (+98-34) 31325103.

Abstract

Road noise is known as one of the risk factors for asthma through several biological pathways. This study aimed to investigate the effect of road noise on the asthma prevalence in the adults. In the current study 3172 adults between 20 and 44 years old were interview through the standardized questionnaire [European Community Respiratory Health Survey (ECRHS)] in Tehran, the capital of Iran. Exposure to the road noise were assessed considering distance of individual participants from the noise monitoring stations belong to Tehran Air Quality Control Company (TAQCC) via the spatial analysis in GIS software 10.1. The effect of noise levels on the asthma symptoms was assessed with the logistic regression. Results were reported as odds ratios (OR) with 95% confidence interval (CI). Results showed a significant positive association between asthma, noise levels at day-time (OR 1.03; 0.98 to 1.05) and night-time (OR 1.05; 0.84 to 1.09). Furthermore, a significant positive association was observed between day-time and night-time noise level and other asthma symptoms included wheezing, wheezing without cold, nocturnal chest tightness, nocturnal dyspnea, nocturnal cough and asthma medication. Association between current asthma and noise level was not significant. There was a significant association between age of the study population and prevalence of the current asthma (P=0.001). Therefore, it could be concluded that chronic exposure to the road noise especially in night-time can increase asthma prevalence. So, control of noise sources is recommended to reduce the asthma in Tehran metropolis.

Keywords: Road noise; Asthma; Tehran; Respiratory diseases.

Investigation of Legionella Pneumophila Bacteria in Hospital Water Supply Systems

Mohammad Darvishmotevalli[1], Maryam Moradnia[2*], Mohammad Noorisepehr[1,3], Sheno Ghaderi[4], Mehdi Salari[5]

[1] Research Center for Health, Safety and Environment (RCHSE), Alborz University of Medical Sciences, Karaj, Iran, mohamad.darvish68@gmail.com
[2] Student Research committee, Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran, Moradnia.mui@gmail.com
[3]Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Karaj, Iran, dr.noorisepehr@gmail.com
[4] Department of midwifery, Faculty of nursing and midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran, shenoqaderi66@gmail.com
[5] Department of Environmental Health Engineering, School of Health, Hamadan University of Medical Sciences, Hamadan, Iran, msalari@yahoo.com

***Corresponding author:** Maryam Moradnia, email:Moradnia.mui@gmail.com

Abstract

Aim of study: Legionella Pneumophila bacteria are known as one of the most important nosocomial infections and the most common cause of death in patients. This study was aimed to identify Legionella Pneumophila bacteria in hospital water supply systems

Methodology: This descriptive cross-sectional study was performed to identify Legionella pneumophila in hot and cold water systems of important and sensitive wards of Imam Khomeini Hospital in Divandareh city (neonatal, dialysis, obstetric, gynecological and men's surgery). A total of 60 samples were collected from these sections.

Results: According to the results of this study, a total of 17 (28%) of all samples were infected by Legionella pneumophila bacteria in water supply systems including hot showers and cold water in neonatal, dialysis, delivery, surgery. gynecology and men's surgery wards were identified.

Conclusion: Lack of proper water treatment system, low residual chlorine content, and presence of biofilm in water supply system and proper temperature range of growth with this bacterium could be the major causes of Legionella contamination in the studied hospital.

Keywords: Infection, Legionella, Hospital

Bacterial Contamination in Surface and Water Line of Dental Unit

Maryam Moradnia[1], Mohammad Noorisepehr[2,3], Mohammad Darvishmotevalli[3]*, Sheno Ghaderi[4]

[1] Student Research committee, Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran**,** Moradnia.mui@gmail.com
[2]Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Karaj, Iran, dr.noorisepehr@gmail.com
[3] Research Center for Health, Safety and Environment (RCHSE), Alborz University of Medical Sciences, Karaj, Iran, mohamad.darvish68@gmail.com
[4]Department of midwifery, Faculty of nursing and midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran, shenoqaderi66@gmail.com

***Corresponding author:** Mohammad Darvishmotevalli, email:Mohamad.darvidh68@gmail.com

Abstract

Aim of study: Water supply systems and various parts of dentistry have the ability to aggregate biofilms and so the transmission of dangerous diseases for staff and patients. The aim of this study was to determine the bacterial contamination of surfaces and water system of the general dental practice in Divandarreh City. **Methodology:** Totally, 120 samples were collected from different parts of the units. Total *coliform, pseudomonas aeruginosa*, *legionella pneumophila* were counted before and after disinfection by Deconex.

Results: The results of this study showed that in all the samples collected from units of the general dental units before and after disinfection, the results were positive for *pseudomonas aeruginosa*, total coliform, and *legionella pneumophila*, (except for Open and close bolt of unit water and the lamp ON and OFF buttons after disinfection). Furthermore, the inlet and outlet water of units were positive for *pseudomonas aeruginosa*, total *coliform*, and *legionella pneumophila* and there was not found significant difference between the inlet and outlet water of units ($p < 0.05$).

Conclusion: It can be concluded from the obtained results that the level of contamination of water and surface of the studied general dental practice is high. Furthermore, since a considerable number of bacteria were identified after disinfection at the different surface of the unit, it indicates improper use of the disinfectants and the presence of biofilms in the unit tubes.

Keywords: Dentistry, Legionella pneumophila, Total coliform, Pseudomonas aeruginosa, Bacteria

Determination of Ni, Cr, Co, Pb, and Cd in Cream Foundations and Assessment of Their Dermal Sensitivity, Carcinogenicity, and Non-carcinogenicity

Mohammad bagher Miranzadeh [1,2], Gholamreza Mostafaii[1,2], Raheleh kafaei [3], Fatemeh Atoof [4], Gholamreza Hoseindoost[1], Fahimeh Karamali [1]*

[1] Department of Environmental Health Engineering, Faculty of Health, Kashan University of Medical Sciences Kashan, Iran
[2] Social Determinants of Health Research Center, Kashan University of Medical Sciences, Kashan, Iran
[3] student research committee, school of public health and safety, shahid beheshti University of Medical Sciences, Tehran, Iran
[4] Departments of Biostatistics & Epidemiology, Faculty of Health, Kashan University of Medical Sciences, Kashan, Iran

***Corresponding author:** Fahimeh Karamali, f.k3630@gmail.com

Abstract

Aim: The current study aimed at determining the concentration of heavy metals in cream foundations. For this purpose, the concentration of five heavy metals including lead, cadmium, nickel, chromium, and cobalt were measured in four brands of cream foundations selected from the Iranian market (two domestic and two imported brands).

Methodology: Measurements were performed using ICP-OES in 36 samples in three colors of dark, beige, and light.

Results: According to the obtained results, the concentration of lead was 1.45-398.5, cadmium ND-4.77, nickel 1.75 - 16.92, chromium 3.52-30.9, and cobalt 0.45-3.77 µg/g. The total content of heavy metals was higher in two Iranian brands than the two imported ones. In terms of color, the results indicated that the distribution of heavy metals did not follow a certain pattern in different colors. According to the guidelines, all the tested samples were within the safe range in terms of non-carcinogenicity, carcinogenicity, and dermal sensitivity. Conclusion: due to the high concentration of trace elements in the samples, their health consequences in consumers should not be overlooked.

Keywords: Heavy Metals, Risk Assessment, Cosmetic cream

The Effect of Hookah Consumption on Male Fertility Parameters in Bandar Abbas: A Case-control Study

Sharareh Gholamrezazadeh[1], Sakine Shekoohiyan[2,*], Soghra Fallahi[3]

[1] Masters of Environmental Health Engineering, Hormozgan University of Medical Science, Bandar Abbas, Iran.; Email address :sharareh.2020@yahoo.com
[2] Ph.D. Assistant Professor, Department of Environmental Health Engineering, Tarbiat Modares University, Tehran, Iran. ; Email address: S.Shekoohiyan@.yahoo.com
[3] Ph.D. Assistant Professor, Reproductive Biology, Hormozgan University of Medical Science, Bandar Abbas, Iran; Email address:.Fallahi.leila@gmail.com

***Corresponding author:** Sakine Shekoohiyan

Abstract

Objectives: Smoking is one of the most important health issues in the world and hookah consumption is very popular in the Middle East and Africa. Due to the high prevalence of hookah consumption in our country, especially in the southern regions and lack of knowledge about the health effects of its use, especially on reproductive system, we decided to conduct a study to investigate the effects of tobacco consumption on sperm parameters of men that referred to Imam Reza clinic in Bandar Abbas.

Methods: The participants of this study included men who had referred to the laboratory for semen analysis. People were categorized in tobacco consumer group (40 people) and non-consumer group (40 people) based on simple random sampling. The demographic information was collected by a researcher-made checklist. Semen samples were taken from the participants with informed consent and ensuring that information was kept confidential. Semen parameters such as pH, volume, morphology, and sperm density were analyzed according to the WHO guideline using a computer-assisted sperm analysis (CASA).

Results: The results showed there was no statistically significant difference between tobacco consumer and non-consumer groups in terms of demographic criteria. Mann-Whitney U test showed that pH and volume of semen did not differ between the two groups, while two groups have a significant difference in sperm density and morphology. The total number of sperm in the semen of tobacco consumer and non-consumer groups were 30.47±9.52 and 70.56±17.16 million per mL, respectively (P_{value} <0.001).

The shape of the head and tail of the sperm were examined morphologically and the results showed that 50.67±4.31 and 34±2.43% of the sperms of the non-consumer and consumer group, respectively had a normal shape (P_{value}< 0.05). Morphological comparison showed that in the tobacco consumer and non-consumer group 13.8% and 18.2% of abnormal sperms had a constricted head, which were statistically significant (Pvalue <0.001).

Conclusion: According to the above results and the existence of a general attitude that hookah is safer than smoke, it seems necessary to be aware of its adverse effects on human health, especially on male fertility parameters.

Keywords: Hookah, Tobacco, Sperm parameters, Male Infertility

Determination of Sodium Dithionite in Traditional Breads and Health Risk Assessment; A Case Study in Qom Province

H. Izanloo[1], R.Aali [1], M.Mozafari[2], Y. Ghafuri[1*]

[1] Research Center for Environmental Pollutants, Qom University of Medical Sciences, Qom, Iran
[2] Health Center of Qom University of Medical Sciences, Qom, Iran

**** Corresponding author:*** Tel**:** +9832536602040 E-mail: yadollahghafuri@yahoo.com
Yadollah. Ghafuri, E-mail:yadollahghafuri@yahoo.com
Hassan.Izanloo, E-mail: h-izanloo@muq.ac.ir
Mehdi. Mozafari, E-mail: M.Mozafari@yahoo.com
Rahim.Aali, E-mail: aali1400@gmail.com

Abstract

The aim of this study is determination of sodium dithionite in traditional breads and health risk assessment, case study Qom provinceThis study was designed in two stages. In the first stage of the study, the quantities of Sodium dithionite in the traditional breads (4 type of bread with code number of 1, 2, 3, and 4) were determined. 70 samples were randomly selected from the bread production center and analyzed by spectrophotometer in 560 nm and apparatus limit of detection (LOD) was determined as 1 mg/l. In the second stage of the study, health risk assessment was considered. Required data were collected by a structured questionnaire (NUTRIKAP) and through the interview with the eligible subject in each household. The sampling method at households Level was the single stage cluster sampling with sample size was estimated 456 (57 clusters of 8 people in Qom province)
The results of Sodium dithionite test in bread samples showed that in 40% of all samples analyzed, the amount of Sodium dithionite was determined at the range of 1.23 ± 0.99 ppm. The results of the risk assessment of consuming bread with Sodium dithionite for all age groups showed that the hazard quotient (HQ) is <1 and therefore, according to the pattern of bread consumption, the daily intake of Sodium dithionite does not pose a significant health risk. Due to the large share of bread in the daily food basket, continuous monitoring of unauthorized additives, including Sodium dithionite, is inevitable.

Key Words: Sodium dithionite, bread, Risk, Qom, Health

Challenges of Virus in Wastewater Facilities and Employee Protection Strategies (Emphasis on Covid-19 Virus)

Neematollah Jaafarzadeh Haghighi Fard [1,2], Sahand Jorfi [1,2], Masoud Panahi Fard [3]*

[1] Environmental Technologies Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[2] Environmental Health Department, School of Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[3] Ph.D. Student of Environmental Health Engineering, Student Research Committee, School of Health Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

*** Corresponding author:** Email: masoudpanahifard@gmail.com, Tel: 09120795168

Abstract

Population growth and travel have a significant impact on the prevalence of viral diseases. Most pathogens can be present in aquatic environments such as wastewater and therefore pose a threat to the health of people with high exposure to wastewater. The widespread outbreak of coronavirus in 2019 in different countries has increased the number of patients with Covid-19 and also increased the rate of use of personal protective equipment, especially masks. So far, many studies has been conducted to investigate the presence of this virus in wastewater, as well as methods to reduce the exposure of workers in wastewater facilities. Therefore, the purpose of this study is to provide information about the presence of Covid-19 virus in wastewater and also to provide the most appropriate solutions to reduce the exposure of people working in wastewater facilities to this virus. To this end, articles published by 2020 in international databases, including Scopus, Science Direct Springer, PubMed, and Taylor & Francis Online, using the keywords Covid-19, SARS-CoV-2, Coronavirus, Wastewater Virus, Personal Protective Equipment, PPE was performed. 53 articles were found in the preliminary search. After reviewing the articles, according to the purpose of the study, 12 studies were selected. Studies have confirmed the presence of SARS-CoV-2 related ribonucleic acid in wastewater in wastewater collection, transmission, and treatment systems. Although the use of disinfection processes in the wastewater treatment phase may inactivate or destroy the coronavirus, the risk of exposure to Covid-19 disease, especially those working in wastewater collection, transmission, and treatment facilities with The SARS-CoV-2 virus is present before the sewage disinfection stage. Therefore, to protect people working in sewage facilities, it is necessary to identify critical points in this field and appropriate solutions to reduce the risk and increase safety, including occupational safety analysis in these facilities and guidance on the use of appropriate personal protective equipment against exposure to SARS-CoV-2 to be provided.

Keywords: Virus, Covid-19, SARS-CoV-2, Wastewater

Impact of $PM_{2.5}$ and PM_{10} Particle Concentrations on the Prevalence and Mortality of COVID-19: A Review Study

Neematollah Jaafarzadeh Haghighi Fard[1,2], Arezoo Rezaei[3], Sahand Jorfi[1,2],kamran tari[4], Amir Zahedi[5], Masoud Panahi Fard [5]*

[1] Environmental Technologies Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[2] Environmental Health Department, School of Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[3] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[4] Ph.D Student of Environmetal Health Engineering, Student Reasearch Committe, School of Public Health,Hamadan University of Medical Sicences, Hamdan, Iran
[5] Ph.D. Student of Environmental Health Engineering, Student Research Committee, School of Health Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

***Corresponding author: Email:** Masoudpanahifard@Gmail.Com, **Tel:** 09120795168

Abstract

Today, according to the spread of the new coronavirus (SARS-CoV-2) in different parts of the world, it is very important to know the epidemiological behaviors and different transmission routes of the virus in order to control the prevalence and mortality of SARS-CoV-2. Recently, several studies have studied the effect of increasing concentrations of air pollutants on the prevalence and mortality of SARS-CoV-2. Therefore, the aim of this study was to provide information on the role and effect of $PM_{2.5}$, PM_{10} in the air on the prevalence and mortality of Covid-19. For the purpose of the study, the articles published within 2019-2020 were searched in the international databases, including PubMed, Science Direct, Scopes, using the keywords of Pollution and COVID-19, SARS-COV-2, Particulate Matter, PM and COVID-19 and SARS-COV-2. The preliminary search yielded 263 articles. After reviewing the articles, 11 studies were finally selected considering the purpose of the study. Although the potential effects of exposure to SARS-CoV-2 virus through the air have not yet been proven, the results of previous studies have shown that increasing the concentration of $PM_{2.5}$ particles is an important factor in increasing the prevalence and lethality of COVID-19. In addition, PM10 particles have a lower impact on mortality than $PM_{2.5}$. Due to the fact that the data related to the mortality rate are not accurate to COVID-19, more studies are needed to determine the share of $PM_{2.5}$, PM_{10} in prevalence and mortality due to Covid-19.

Keywords: Air Pollution, Particulate Matter, $PM_{2.5}$, PM_{10} ،Covid-19

Evaluation of the Type and Concentration of Bioaerosols in the Air of Operating and Isolation Rooms of Hospital

Maryam Dashti [1*], Hadi Sadeghi [2], Mehdi Vosoughi [3], Seyed Ahmad Mokhtari [4]

[1] Department of Environmental Health Engineering, School of Public Health, Ardabil University of Medical Science, University of Medical Science Ardabil, Iran
[2] Department of Environmental Health Engineering ,School of Public Health, Ardabil University of Medical Science, University of Medical Science Ardabil, Iran
[3] Social Determinants of Health Research Center, Ardabil University of Medical Science, Ardabil, Iran
[4] Department of Environmental Health Engineering ,School of Public Health, Ardabil University of Medical Science, University of Medical Science Ardabil, Iran

***Corresponding authors:** Maryam dashti; E-mail address: Maryam.dashti59@gmail.com ; Tel.: +989125394028

Abstract

Hospitals are sensitive places because they can threaten the health of staff and patients or their companions. The aim of the present work was to evaluate the type and concentration of bacterial and fungal bio-aerosols in the indoor air of four operating rooms (ORs) and four wards in Khalkhal during 2019. Active sampling was performed in ORs and wards, and a total of 192 bacterial and fungal samples were measured. The mean total concentrations of airborne bacteria for both of ORs and wards limited between 11±1.2 to 48±3.1 CFU/m^3, while for airborne fungi ranged from 95±5.6 to 51±1.2 CFU/m^3. The predominant genera of airborne bacterial isolated in the indoor air of ORs vs. wards were *Staphylococcus epidermidis* (72% vs. 58%), *Group D Streptococcus* (4% vs. 17%), *Group A Streptococcus* (13% vs. 3%), and *Staphylococcus saprophyticus* (6% vs. 4%). In addition, the main fungal species identified in the indoor air of ORs vs. wards were *Cladosporium spp.* (37% vs. 38%), *Penicillium spp.* (28% vs. 22%), and *Aspergillus niger* (21% vs. 12%). A statistically significant correlation was observed between the mean concentration of bio-aerosols and population ($p < 0.05$). The results of statistical analysis reveals that a statistically significant difference exists between the mean concentrations of bio-aerosols and the values recommended by WHO ($p < 0.05$); this may be due to unsuitable and inadequate disinfection, improper design and operation of standard central ventilation (SCV), and high density of visitors and patients. Designing and operating appropriate of SCV, controlling density of visitors and patients, enforcing more precise, regular, and comprehensive disinfection methods, and supervising of waste, especially medical waste can boost reduction airborne fungi and bacteria in hospital.

Keywords: Fungi and bacterial; Bio-aerosol; Hospital; Operating room; Disinfection

Severe Heavy Metal Pollution of Road Dust in a Region with High Diesel-Vehicle Traffic in Hormozgan Province; Health Risk Assessment

Mohsen Heidari[1*], Tooba Darijani[2], Vali Alipour[2]

[1] Department of Environmental Health Engineering, Faculty of Medical Sciences, TarbiatModares University, Tehran, Iran; Email: moheidari84@gmail.com
[2] Department of Environmental Health Engineering, Faculty of Health, Hormozgan University of Medical Sciences, Bandar Abbas, Iran; Email: toobada86@gmail.com, v_alip@yahoo.com

*** Corresponding Author:** Mohsen Heidari; Email: moheidari84@gmail.com

Abstract

Locating main industries and international port complexes in the west of Bandar Abbas resulted in high density of diesel-track traffic in this region and this condition increased the probability of environmental pollution. In this study, the content of toxic metals of the dust settled on the surface of the road leading to Shahid Rajaee port was measured. The concentrations of Arsenic, Cadmium, and Lead in the road dust were 26.88, 3.12, and 620.83 µg/g, respectively, indicating the very high level of pollution compared to other regions in Iran. Probabilistic health risk assessment showed that there is significant health risk attributed to heavy metals, especially Arsenic, for children in this region. Hence, it is essential to take measures to control the sources of environmental pollution, especially traffic emission, in this region.

Key words: Road dust, Heavy metals, Health risk, West region of Bandar Abbas

Investigation of Seasonal Variation and Probabilistic Risk Assessment of BTEX Emission in Municipal Solid Waste Transfer Station

Ashraf Mazaheri Tehrani[a], Abdulrahman Bahrami[b], Mostafa Leili[a], Jalal Poorolajal[c,d], Dostmorad Zafari[e], Mohammad taghi Samadi[a*] & Amir Hossein Mahvi[f,g*]

[a] Department of Environment Health Engineering, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[b] Center of Excellence for Occupational Health, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[c] Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[d] Modeling of Non communicable Diseases Research Center, Hamadan University of Medical Sciences, Hamadan, Iran
[e] Department of Plant Protection, Buali University, Hamadan, Iran
[f] Center for Solid Waste Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran
[g] Center for Air Quality Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran

[*]**Corresponding authors:** Mohammadtaghi Samadi, Email: samadi@umsha.ac.ir, Amir Hossein Mahvi, Email: ahmahvi@yahoo.com

Abstract

The municipal solid waste transfer stations (MSWTSs) affects both the environment and human health. The present study aimed to investigate the Concentrations of BTEX (benzene, toluene, ethylbenzene, and xylene) the important group of VOCs, in the ambient air of municipal solid waste transfer station ($MSWT_S$) of Hamadan city and to estimate stochastic cancer and non-cancer risk for inhalation exposure to BTEX compounds by Crystal Ball software. The average produced amount of solid waste in Hamadan in 2109 has been estimated to be over 150,000 tons. The solid waste mostly consisted of a complex mixture containing kitchen/food waste (56.85%), consumed plastics (11.33%), paper (2.88%), glass (1.20%), and other materials (27.74%), which collected from households and commercial areas. The findings revealed that BETX concentration in the ambient air of MSWTS in summer is higher as compared to the spring season. The 95% percentile lifetime cancer risk (LCR) value for benzene was estimated to be 8×10^{-4}, which is higher than the recommended standards (10^{-6}). The obtained 95% percentile hazard quotient (HQ) value for xylene was found to be higher than the suggested value of 1. Furthermore, the total cumulative value of the 95th percentile HQs for (toluene, ethylbenzene, and xylene) TEX was obtained to be about 3.39, which is higher than the acceptable value of HQ. The results of sensitivity analysis for LCR of benzene and HQs of TEX disclosed that the parameter of pollutants concentration has the highest effect on risk's variance. According to the values of cancer and non-cancer risk assessment, that were higher than safe levels and the major contribution of pollutant concentration in sensitivity analysis, it is concluded that the implementation and development of technical and engineering control measures must be regarded as an essential target to reduce workers exposure to the pollutants and to decrease the concentration of the pollutant in the ambient air of MSWTS.

Keywords: Municipal solid wastes, Transfer station, BTEX, Probabilistic risk assessment, Monte-Carlo simulation

Investigating the Relationship between Heavy Metals in Drinking Water and Cancer: A Systematic Review

Hossein Kardan Yamchi [1], Mohammad Hassan Ehrampoush [2], Ali Asghar Ebrahimi [3]*

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
[3] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; **Email address:**ebrahimi20007@gmail.com

*** Corresponding author:** Hossein Kardan Yamchi

Abstract

Aim of study: One of the most important and influential pollutants in the water is heavy metals, which exceeds its permissible levels causing various diseases, including cancer. The aim of this study was to review the relationship between the amount of heavy metals in drinking water and cancer and provide a more effective solution.

Methodology: This was a systematic review using the PRISMA protocol to search literatures in international (PubMed, Google Scholar, Science Direct) and national (SID, Magiran, and MedLib) databases. According to the PICOS strategy, all published papers were retrieved in English and Persian languages until February 2020 using different combinations of keywords such as water, heavy metals, and cancer and the Persian equivalent keywords. Final selected papers were critically appraised with the PRISMA checklist.

Results: Results of review studies showed that the presence of heavy metals in water has many effects on human carcinogenic risk. In some studies, analyzes of water samples have shown a significant relationship between the amount of heavy metals and the incidence of cancer. Calculation of various index such as Carcinogenic Risk (CR), Total Carcinogenic Risk (TCR), Excess Lifetime Cancer Risk (ELCR) index, Health Risk Assessment index (HRA_{EPA}) on the carcinogenic effects of heavy metals and its comparison with standards in various studies show that most heavy metals, especially Arsenic, lead, cadmium and chromium have a high potential for carcinogenicity in humans through drinking water.

Conclusion: Some studies have emphasized the relationship between the amounts of heavy metals in water to cancer. Increasing the concentration of heavy metals and their compounds from the maximum acceptable concentration in drinking water has adverse effects on human health and leads to mutagenicity or carcinogenesis. To prevent the harmful effects of heavy metals in water, the first step is to control man-made pollutant sources and continuous monitoring and pre-treatment.

Keywords: Heavy Metals, Water, Cancer, Systematic Review

Dispersion Modeling of SARS-CoV-2-Laden Particles in Ambient Air

Mostafa Rezaali [1], Reza Fouladi-Fard [2]*

[1] Independent Researcher, Isfahan, Iran (formerly: Department of Civil and Environmental Engineering, Qom University of Technology, Qom, Iran).
[2] Research Center for Environmental Pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran.

***Corresponding author:** rezafd@yahoo.com , rfouladi@muq.ac.ir

Abstract

COVID-19 is now a pandemic and the knowledge gap on SARS-CoV-2, i.e., the COVID-19 disease agent, dispersion persists. The US Centers for Disease Control and Prevention suggests fomites may not be the main route through which the novel coronavirus spreads. Supporting the same view, the latest the World Health Organization report recommends wearing masks for every individual in public, highlighting the transmission through the air. In the current study AERMOD, one of the most validated and tested models suggested by the USEPA, is used to model SARS-CoV-2-laden PM10 in a hypothetical outdoor environment. Multiple scenarios including particle size, wind speed, source height variations as well as and combined scenarios were modeled to estimated how exposure risk changes with the above-mentioned variables. The results reveal that wind speed majorly narrows infectious plume rather than transferring the peak concentration. The particle size variation indicated that small particles, i.e.,0.01-2.5 µm, could reach more than 9 m away from the source in concentration range of 10-20 (µg/m^3). On the other hand, source height contributes to peak plume shift rather than dispersing the infected particles. This idea was further studies by using combined scenarios which indicated height difference can impact peak plume displacement rather than wind speed. In the worst-case scenario, the results indicate that the virus-laden particles can travel outdoors more than 8 m away from an infected source. The video output of the model results clearly shows the dynamic of viral peak shifts in several scenarios. The results also indicate that in specific conditions the airborne SARS-CoV-2 can be transported to 9 m away from the source. These findings can be useful for individuals as well as decision-makers to mitigated exposure risk in real-world conditions.

Keywords: COVID-19; SARS-CoV-2; AERMOD; Transmission through the air; Virus-laden particles

Relationship between Air Polluter Level and Respiratory Patients' Referring Rate to Selected Karaj Hospitals and Death Rate Originating during 2015-2019

Peyman Kalantary [1], Babak Kakavandi [2], Somayeh Yousefi [3*], Hoora Haji [4], Kourosh Kabir [5]

[1] Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Alborz, Iran (kalantar_co@yahoo.com)
[2] Assistant Professor, Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Alborz, Iran (kakavandibvch@yahoo.com)
[3] MSc Student, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (syousefi852@yahoo.com)
[4] Medical Student, Medical School, Alborz University of Medical Sciences, Alborz, Iran (hoora_haji@yahoo.com)
[5] Associate Professor, Department of Social Medicine, Medical School, Alborz University of Medical Sciences, Alborz, Iran (kabir.kourosh@yahoo.com)

***Corresponding author:** Somayeh yousefi, Email: Syousefi852@gmail.com, Tell : +989025611571

Abstract

Cities expansion, development of migration, and industries inappropriate expansion are some factors in air pollution. Harmful effects of air pollutants are most on the respiratory system. Exposure to high concentrations of air pollutants leads to exacerbating a variety of respiratory diseases such as asthma, bronchitis, emphysema, pneumonia, and chronic obstructive pulmonary disease. The aim of this study is to investigate the relationship between air pollutants level and rate of referral of respiratory patients in selected hospitals, and mortality due to these diseases in the period 2015-2019. After entering data into Excel software, were filtered and counted based on the patient's admission date, age, and sex in the groups of men and women over and under 60 years old. According to the results, respiratory patient's proportion in autumn and winter was higher than in spring and summer. The increase in respiratory patients during the cold seasons shows a possible relationship by temperature inversion. As a result, increasing the pollutant's concentration on the ground, increase the hospitals refer due to respiratory symptoms. It is obviously a non-clear correlation between the air pollutants concentration and human health effects of air pollutants, which prevents the establishment of a strategy to control air pollution. Improving air pollution requires investment and alteration in lifestyle and energy consumption patterns.

Keywords: Air pollution, respiratory patients, Karaj

4th International and
23rd National Conference
on Environmental Health
2 - 4 March 2021
Yazd-Iran

Environmental Health; Public education and Social Responsibility

Poster

The Effect of Training on Behavioral Change and Awareness of 30-60 Year-old Women on the Complications of Sunlight Radiation UV in Mashhad's Health Centers

Maryam Payedar[*1], Mona Tabrizi azad[2], GholamReza Farahzad[2], Fatemeh Kafashan[3], Malihe Fakhlaee[3], Kobra Paykar[3]

[1*] MSc,Environmental health specialist, Department of Environmental Health Engineering, faculty Health, Mashhad University of Medical Sciences, Mashhad, Iran. Email: Paydarm1@mums.ac.ir
[2]MSc, Department of Environmental Health Engineering, School of Public Health Mashhad, Mashhad, Iran
[3] BS, Department of Environmental Health Engineering, , Mashhad University of Medical Sciences, Mashhad, Iran.

***Corresponding author::** paydarm1@mums.ac.ir. Tel: 09155223004

Abstract

Half of the world's population is made up of women; this large group in direct relation with other social and family groups can contribute to sustainable growth and development of the city through education and literacy. Skin cancer is the third most common cause of mortality in Khorasan Razavi and the second most common cancer in women in the province. The sun's ultraviolet rays are important factors in causing skin cancer. This study aimed to determine the effect of educational intervention on skin cancer prevention behaviors and its predisposing factors in women referred to Mashhad health centers. This semi-experimental interventional study was conducted on 69 women referring to health centers. Data were collected using random sampling and a valid questionnaire. In the first stage, their knowledge and performance were assessed, then educational programs were designed based on educational needs and were implemented through face-to-face training and group discussion. And after a month, their knowledge and performance were evaluated again. The collected data were analyzed by the SPSS 24 using parametric tests (Independent t-test, paired t-test, and regression analysis). Results showed that the most protective measure was the use of shadows in the middle of the day (62.3%) and the least use of sunglasses (42%). The average score of awareness before training was 6.0435 and after training was 9.0435 and the performance score before training was 43 3.638 was obtained after training. The results show that the average knowledge score was 3 and performance score was 3.2 after training, which was also statistically significant ($p < 0.05$). The highest change was related to sunglasses, ranging from 46.4% to 92.8%. The highest level of education (46.37%) was related to diploma degree and there is no significant difference in the mean score of knowledge and performance before and after education of individuals at different levels of education. It was concluded that education has a significant role in improving the performance of people in the methods of prevention and protection from sunlight. Given the priority of prevention over treatment, applying training programs can increase knowledge and promotion of skin cancer preventive behaviors.

Keywords: Education, knowledge, performance, ultraviolet, Mashhad

Knowledge, Attitude, and Performance of Students in Isfahan University of Medical Science about Solid Material Recycling

Sepideh Sadeghi [1*], Fatemeh Hajialikhani [2], Farzaneh Mohammadi [3], Mahnaz Nikaeen [4]

[1*]Corresponding Author: MSc Student of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; Diba13740@gmail.com
[2] B.S student in Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran; fatemehalikhani1234@gmail.com
[3]Assistant Professor of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran; fm_1363@yahoo.com
[4] Professor of Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; nikaeen@hlth.mui.ac.ir

Abstract

Introduction: Recycling has been proposed as an economic approach because of the reduction of raw material production costs, energy savings and reduced disposal, as well as due to the scarcity of resources and the increase of various environmental pollutions. The aim of this study was to determine the knowledge, attitude and performance of the students of Isfahan University of Medical Sciences about solid material recycling.

Methods: In this study, 252 students of Isfahan University of Medical Sciences were studied by stratified sampling. Data collection tool was a 27-item researcher-made questionnaire with validity and reliability. Out of 27 questions, 3 questions were related to the demographic section, 10 questions were related to the awareness section, 7 questions were related to the attitude section and 6 questions were related to the performance area. Data were analyzed by Mann-Whitney and Kruskal-Wallis tests after entering SPSS26.

Results: The mean score of knowledge was 14.7±2.4 indicates moderate awareness (score range 0 to 20), attitude 29.09±2.60 indicates favorable attitude (Score range 38-37), practice equal to 4.94 ±1.38 showed moderate performance (score range 0-8). In this study, there was no significant difference between knowledge and attitude with the variables of education, college and gender, but the performance of female students was higher than male students, so that 84% of boys had average performance, but this ratio was 100% in girls.

Conclusion: The results of this study showed that more than 80% of students have an acceptable knowledge about solid waste recycling. According to the results of the study, relatives and friends, followed by radio and television, gave the most information to the audience. Therefore, in order to succeed in recycling solid waste, having an educational program using mass media, offering special classes and educational seminars, in addition to providing optional courses for students can be an effective way to increase awareness, public participation and further success of the waste management program.

Keywords: Recycling, Solid Waste, Awareness, Attitude, Performance

Study of Environmental Health Status of Primary Schools in Bandepey Sharghi County in 2019

Mahdieh Bagheri Parichan

Abstract

The school is a place that has high potential for producing and disseminating health hazards due to the long term presence of different students. This study is a descriptive _ cross sectional study and the statistical population under study is the elementary schools of Eastern Bandpay. The sampling method as a census and data collection tool in this study is checklist that is based on a questionnaire approved by the world health organization. By entering the mentioned schools and obtaining permission from the principal of the centers, the researcher completes the checklist. After collecting the data, the collected information will be analyzed by using Excell software. The results of present study show that the schools in the region aren't in a good position in terms of the condition of the toilets and 70% of them are lower than the standard level. In terms of the personal hygiene, the schools in question are not in good condition and only 20% of the schools have a hand washing guide. Fortunately, all school had a proper and standard heating system. Light radiation in all school is from left and is standard accordingly. In all school in the region sewage has been collected properly. Unfortunately, none of the schools had proper desk or bench.In some school, the condition of the heating system, sanitary waste bin, smoking ban, healthy sink, healthy refrigerator, billboard, sewage collection and disposal waste, water supply, painting classes were optimal. But unfortunately, in some schools, the condition of the air conditioner, the prayer hall, the construction site of the schools, the gym, the door installation, healthy desk and bench and fits the standard, hand washing guide and,etc. have been undesirable. The authorities pay more attention to solving these problems.

Key words: Environmental health, School, Health school, Bandepey sharghi

Educational Needs Assessment in the Catchment Area of Lake Urmia: Prioritization of Educational Topics by Students and Experts in the Field of Health and Environment

Najmeh Shahmahdi [1, 2] Reza Dehghanzadeh [1, 2*]

1Health and Environment Research Center, Tabriz University of Medical Sciences, Tabriz, Iran;
2 Department of Environmental Health Engineering, Tabriz University of Medical Sciences, Tabriz, Iran;
Nshahmahdi@gmail.com

*** Corresponding author:** Dehghanzadeh Reza Email: dehghanzadehr@tbzmed.ac.ir

Abstract

Objectives and Background: Urmia Lake is the largest water complex in Iran, which has significant economic, cultural, aesthetic, recreational, scientific, conservation and ecological values. The drying process of Lake Urmia in recent years due to surface current deviations, groundwater extraction, and lack of efficient water management has caused many health and environmental problems. Therefore, in order to be able to play our role well in managing the health effects of this crisis, it is necessary to make the necessary preparations in this regard and for the people to have sufficient education and awareness. Assessing and recognizing training needs is a prerequisite for a successful training system that, if done properly, will provide a more objective basis for planning and increase the likelihood of adapting to the needs of the organization, areas of work, and staff, and ultimately its efficiency.

Materials and Methods: This need assessment study was conducted using Delphi technique. The research population includes faculty members and students in the fields of environmental health and environment. 166 people participated in this study and answered the questions in the questionnaire in 3 rounds of Delphi.

Results and Discussion: 56 items in 8 sections: Climate change and its effects on human health, water quantity and quality, air pollution, waste, food health and safety, soil pollution, environmental health laws and regulations, environmental culture and public participation extracted. In the second round, on average, 2 needs received lower scores from each section that were removed from the questionnaire. The other topics scored high again in the third round, and as a result, no need was eliminated in this section, which indicates the high importance of the content regarding education.

Conclusion: By using specialized human resources and determining educational needs, it is possible to empower and increase the level of awareness and skills of people regarding the management of environmental and health risks caused by the drying of Urmia Lake.

Keywords: Needs Assessment, Delphi, Health, Urmia Lake, Environment

Investigating the Environmental Health Status and Public Awareness of Kashan People in the Field of Health Issues

Seyedeh Somayeh Yousefi [1], Mohammad Rezvani Ghalhari [1], Gholamreza Hoseindoost[2], Faezeh Asgari Tarazooj [2], Gholamreza Mostafaei *[,2]

[1] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
[2] Department of Environmental Health Engineering, Faculty of Public Health, Kashan University of Medical Sciences, Kashan, Iran

*** Corresponding author:** Gholamreza Mostafaei, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran , 09215355148

Abstract

Achieving the highest level of health is the main goal and philosophy of the health system. Maintaining and promoting public health requires providing the health services needed by the people. The health status of each individual, community, and nation is affected by the interaction of the two internal environments and the environment around him. Therefore, the existence of a device to monitor the impact of environmental factors on public health is a requirement of all countries. Hospital environments are one of the most prone centers for the spread of infection in the community. Waste landfills are another of these environments that will lead to both direct and indirect health and environmental damage. Awareness is one of the main elements to reduce or eliminate risks; Studies show that monitoring potential locations and informing staff working in these locations will help prevent many problems. Another area of education is changing the habits and attitudes of housewives about food safety. Many infectious diseases, as well as some non-communicable diseases, can be transmitted to humans through water and food, leading to high mortality in a short period of time. Obviously, this depends on the level of knowledge, attitude, and practice of food consumers. The results show that in terms of personal health index, 9 centers with the highest percentage (100%) have the desired status, in terms of safety index, 1 center with the highest percentage. (100%) has a favorable condition, in terms of disinfection and sterilization index 7 centers with the highest percentage (100%) has a favorable condition, in terms of waste index 9 centers with the highest percentage (100%) has a favorable condition, in terms of wastewater index 10 centers With the highest percentage (100%) with favorable condition and finally the average of all indices of 14 centers was estimated at 50.07%.

Keywords: Environmental health, Awareness, Landfill, Food Safety

Significance of Public Environmental Health Education to Improving Social Health

Somayeh Yousefi [1], Mahmood Alimohammadi [2*]

[1] MSc Student, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (Syousefi852@gmail.com)
[2] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Science, Tehran, Iran (m_alimohammadi@tums.ac.ir)

***Correspond author:** Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Science, Tehran, Iran (m_alimohammadi@tums.ac.ir)

Abstract

Education is one of the most important items for changing attitudes and creating environmental sensitivities in society. Continuing education will lead to environmentally friendly voluntary public activities by providing logical reasons. In recent years, several programs held people in environmental activities by educational goals; one of these cases is the annual activity of environmental called Jangalaneh on 18 February. Unfortunately, there was no yet specific public activity had been carried out by environmental health engineering groups in the country. Waste management education and waste reduction methods education is one of the activities that can be done to increase awareness of people. Imagine a group of people that be trained the importance of waste management and segregation with scientific and health reasons by an environmental health engineering; Surely this will be more sensitive and reactions than when only environmental issues are mentioned; Because the environmental health engineer will explain the impact of this practice on the community health.
In this study, we have tried to examine the importance of public health education from the perspective of an environmental health engineer.

Key words: Attitude, Education, Environmental health engineering, Health

4th International and
23rd National Conference
on Environmental Health
2 - 4 March 2021
Yazd-Iran

Environmental Health; Past, Present and Future

Presentations

A Survey on Status and Fate of Employment of MSc and PhD Graduates of Environmental Health Engineering

Sahar Gholipour [1], Meghdad Pirsaheb [2], Mahnaz Nikaeen [3*]

[1] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran, Email: Sahar.gholipour71@gmail.com
[2] Department of Environmental Health Engineering, Faculty of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran, Email: mpirsaheb@yahoo.com
[3] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran, Email: nikaeen@hlth.mui.ac.ir

***Corresponding author:** Mahnaz Nikaeen, nikaeen@hlth.mui.ac.ir

Abstract

The field of environmental health engineering is one of the disciplines of the Ministry of Health, which is offered at three levels: bachelor, master, and PhD. Due to the limited employment capacity of government jobs, it seems that the number of graduated students of environmental health is more than the available jobs. Furthermore, despite the potential for activity in the private sector, a low number of graduates are engaged in the sector. The purpose of this study was to investigate the employment status of graduates of environmental health and their satisfaction with their education in the MSc and PhD courses. In this study, a questionnaire with 36 items was provided online, which was answered by 75 individuals. The results showed that the majority of graduates (61%) of environmental health are unemployed. However, they do not regret continuing their education and are interested in the field. Furthermore, most graduates believe that environmental health has the potential for private sector activity (87.5%), and there is the possibility of entrepreneurship in various fields (88%). According to the results of this study, most participants were not employed, and it is necessary to address the employment of graduates of environmental health with an emphasis on entrepreneurship.

Keywords: Environmental Health, Employment, Postgraduate Studies, Master of science, Doctor of Philosophy

Environmental Health; Past, Present and Future

Posters

A Software Tool for Gravity Sewerage Design, based on the National Instruction of Sewerage Design Rules

Rostami R [1], Mehdinia S M [2], Ghainy Gh [3,*]

[1:]Assistant Professor, Department of Environmental Health Engineering, Damghan Faculty of Health, Semnan University of Medical Sciences, Semnan, Iran. ro.rostamy@gmail.com
[2:] Associated Professor, Department of Environmental Health Engineering, Babol School of Health, Babol University of Medical Sciences, Babol, Iran. smmehdinia@yahoo.ca
[3,*:] Corresponding author: lecturer, Department of Environmental Health Engineering, Damghan Faculty of Health, Semnan University of Medical Sciences, Semnan, Iran. ghainy@gmail.com

Abstract

Aim and study: There are several influencing criteria, such as diameter, slope, and self-cleaning velocity, in design of sewerage systems. There are specific rules for various conditions and the sewer diameter in the national sewerage system instructor which are fully obligatory in design. In this regard, the main gold of this study was preparation of a software tool to faster, correct, presisly design of the sewerage regarding the national instructor.

Methodology: C# programing language was used to preparation of the software. The hydraulic calculations of sewage was performed with using Manning equation for sewage-full condition of the pipes and trial and error method was used for non-full conditions to obtaining the velocity, filled depth of pipe, and the required slope of self-cleaning.

Results: The results showed well accuracy and preciseness of the software with any error in different condition of design process. When the pipe diameter and slope is entered the software, it calculates velocity and depth of sewer regarding the initial flow and final flow in end-life period of sewerage and gives altitudes of pipeline implementation, respect to the national instructor. The results are saved and can be revised and used again.

Conclusion: all of the results were consistent with the national instructor and they were enough accurate and precise. The software is an efficient tool to facilitate and easily calculation of sewerage system design.

Key Words: Sewerage; software; sewage, C#

The doctrine of legal teaching in environmental health engineering

Ahmad reza Shirvani Broujeni [1] , Somayeh Fazeli Farsani [2]

1 Master of Private Law, Expert in Environmental Health Engineering, Isfahan University of Medical Sciences, Technical Committee of the Deputy of Treatment
2 Bachelor of Environmental Health Engineering, Master of Environmental Engineering (Water and Wastewater), Isfahan Health Center No. 2

***Corresponding author:** Ahmad reza Shirvani Broujeni, aryashb2005@gmail.com

Nowadays, in order to ensure public health, environmental health issues such as the right to safe food and water and clean air have become one of the main challenges of international law and are so intertwined with legal complexities that any engineering action has legal implications. It is unique in that resolving disputes over these issues requires familiarity with Legal science.
The study of the legal effects of an engineering project such as industrial wastewater treatment, in the study and implementation phases, is so important that sometimes the progress or suspension of this project depends on concluding a sound contract and inserting the necessary legal materials in the text. As in the case of inspections, the seizure of food can have certain legal implications for the inspector, so that instead of the perpetrator being held accountable, the inspector must formulate a defense.
The purpose of this study is to express the need to teach "environmental health rights" as a textbook to students; Upon graduation, in addition to providing engineering advice, with any action that is considered a threat to public health; With the help of Legal science, report and report it to the courts.
The research method in this research is in the field of descriptive-analytical research and using the library method in the form of scientific books and articles, reputable sites and doctrines of legal scholars, to examine the effective legal processes in environmental health as a past and present subject. It has been taught in neglected health college.
Therefore, in order to protect the environment and public health against threats and pollutants, which guarantee the implementation of the relevant laws and effective action based on the theory of risk and guarantee of rights; Teaching legal rules to the student of environmental health, so that both in terms of the power of analysis of legal materials and in terms of form and procedure, in the future, can defend his professional performance in the courts, can not be denied and therefore the health graduate awareness. We must accept the legal affairs as an integral principle of the engineering and inspection profession.

Key words: Environmental health rights, legal teaching

Environmental Health Past, Present, Future Iran-Asia; The History of Environmental Health

Sara Yaghobian [1], Azam Naderi [2]

[1] Graduate of Master of Environmental Health Engineering, School of Health, Yazd Sadoughi University of Medical Sciences, saeede362@gmail.com
[2] Graduate of Master of Environmental Health Engineering, School of Health, Tehran University of Medical Sciences; Naderia365@gmail.com

***Corresponding author:** sara yaghobian

Abstract

Introduction: Environmental health is a broad and complex issue that seeks to understand the interactions of environmental factors with biological systems. Therefore, exploring environmental health requires coordinated multidisciplinary approaches to understanding and addressing environmental health outcomes.

Environmental health itself is organized into broad thematic topics, each of which is further subdivided into more specific topics. One of the global health priorities is the link between the health and the environment in which we live, the water we drink, the air we breathe, and the food we grow and eat. More than three million children under the age of five die each year from environmental causes such as indoor and outdoor air pollution, polluted water, and lack of proper sanitation. The WHO water and sanitation programs and initiatives, vector-borne diseases, indoor air pollution, chemical safety, transportation, UV, nutrition, occupational health, food safety, and injury prevention, all important They improve the health of the environment.

Methods: This review study, conducted in 1399, was used to review the number of 50 articles indexed in the databases of Proquist, SID, Megiran, Avid, Irandac, IranMedex, ScienceDirect, Corens, Springer, Google Scholar, and Scopus. .

Results: Environmental health in Asian countries is important due to lifestyle changes throughout history, because maintaining a healthy environment is important in increasing the quality of life and healthy years.

Keywords: Asia, Iran, Environmental Health, History

Investigation of Lead Concentration in Cultivated Vegetables in the Suburbs of Sanandaj

Mohammad Darvishmotevalli [1], Maryam Moradnia [2]*, Mohammad Noorisepehr [1,3], Sheno Ghaderi [4], Mehdi Salari [5]

[1] Research Center for Health, Safety and Environment (RCHSE), Alborz University of Medical Sciences, Karaj, Iran, mohamad.darvish68@gmail.com
[2] Student Research committee, Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran**,** Moradnia.mui@gmail.com
[3] Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Karaj, Iran, dr.noorisepehr@gmail.com
[4] Department of midwifery, Faculty of nursing and midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran, shenoqaderi66@gmail.com
[5] Department of Environmental Health Engineering, School of Health, Hamadan University of Medical Sciences, Hamadan, Iran, msalari@yahoo.com

***Corresponding author:** Maryam Moradnia, email: Moradnia.mui@gmail.com@gmail.com

Abstract

Aim of study: Vegetables are an important component of a healthy diet. Contamination of vegetables with heavy metals can lead to biological accumulation in the body of consumers. The aim of this study was to determine the concentration of lead in vegetables grown in the suburbs of Sanandaj.

Methodology: This descriptive cross-sectional study was performed on 120 vegetable samples during four months; each month 30 vegetable samples including basil, radish, onion, cress, and coriander were randomly collected from 5 farms in the suburbs of Sanandaj. The amount of lead in vegetable samples was measured by atomic absorption spectrometry. The results were evaluated using SPSS software.

Results: The mean concentrations of lead in basil, radish, onion, cress and coriander were 0.042 ± 0.018, 0.071 06 0.062, 0.059 03 0.032, 0.023 0 0.022 and 0.072, respectively. It was 0.097 mg / kg. According to the statistical results obtained in this study, a significant relationship was found between lead concentration in radish and onion vegetables (p-value 05 0.05), while no significant relationship was observed between basil, cress and coriander vegetables (0.05 p-value >).

Conclusion: According to the results of this study, the concentration of lead in vegetables was lower than the limit recommended by WHO / FAO and Iranian standards. Due to the increase in widespread environmental pollution, regular monitoring of heavy metal concentrations in food, especially vegetables, is essential.

Keywords: Heavy Metals, Vegetables, Lead, Sanandaj

Perspectives on Environmental Microbiology Course by Promoting and Improving Learners' Attitudes

Setareh Sadeghy [1], Mohaddeseh Dehghan [1], Mehdi Mokhtari [2], Fahimeh Teimouri [2&3*]

[1] Student Research Committee, Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[3] Environmental Science and Technology Research Center, Department of Environmental Health Radiation, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

***Corresponding author**: Email address: f.teimouri@ssu.ac.ir*

Abstract

Environmental microbiology course is one of the compulsory specialized courses for the students, since they will have a lot of practical use of its achievements after graduation. The purpose of this article was to refer to previous topics. And now this lesson is to investigate the strengths and weaknesses and provide practical solution with the approach of promoting and improving the attitude of learners.

Keywords: Microbiology, Learners' attitudes, Enviromental health

Challenges in Management of Carcasses in Live Stocks and Poultry Production

Ahmad Golshiri [1]*, Mehdi Mokhtari [2], Farnaz Ghandehari [3], Sahba Sahifi [4]

[1]* Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; golshiri1995@gmail.com
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School
of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; mokhtari@ssu.ac.ir
[3] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Farnazghandehari98@gmail.com
[4] Department of Environmental Health Engineering, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; sahba_sahifi@yahoo.com

Abstract

Including inevitable consequences of animal husbandry and bird breeding industry, is common fatalities. Today, it is defined that in most diseases, the survival duration of disease factors are long in animal carcasses. The greatness and complexity of animal husbandry and bird breeding along with population growth and increasing the need of more products has caused huge challenges. One of these challenges is correct sanitary disposal. The importance of disposal and destroying the animal carcasses in controlling the diseases is in a deal that specific rules are established in developed countries. Considering the difficulty, time consuming and the cost of management of animal fatality, the strategy of disposal, processing, and maintenance, storage are analyzed in this study based on different aspects. Recent study is a review on management situation of livestock and poultry fatalities and safe disposal of corpses obtained from breeding these animals normally and in natural disasters. The result shows that the necessity of planning principles and development instructions based on science and experience are understandable. So in this situation 2 actions must be taken for reaching a stable environment: First, accurate annually, monthly, and seasonal statistics of fatalities based on the city separations And secondly is to have updated instructions naming the related organizations Moreover livestock and birds carcasses are the problem they can be a way of creating jobs for agriculturalists and ranchers' society that are damaged and support this society in future. This study is done as a review with the goal of considering ways for management of livestock and birds carcasses, emphasizing the reduction of environmental problems.

Keywords: Agricultural waste, waste management, Livestock fatality

The Management of Disaster Debris during Natural Disasters; An Approach to Reduce Environmental Effects

Ahmad Golshiri [1]*, Ehsan Abouee [2], Farnaz Ghandehari [3], Sahba Sahifi [4] Mohammad Reza Barzegar [5]

[1*] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; golshiri1995@gmail.com
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School
Of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; ehsan.abouee@gmail.com
[3] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Farnazghandehari98@gmail.com
[4] Department of Environmental Health Engineering, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; sahba_sahifi@yahoo.com
[5] Waste Management Organization, Yazd Municipality, Yazd, Iran; mr_barzegar1362@yahoo.com

Abstract

Along with mental and physical effects of events and disasters, one of the most important consequences is producing a huge amount of waste that has different effects on environment and human being. Waste Controlling and waste management of disasters are one of the biggest challenges of human society The addition of urbanization and economic growth has increased different types of waste produced by disasters , moreover it has increased the volume density and amount of this kind of waste in compare with the past , and it has affected all the actions taken as emergency management after disasters This kind of waste can cause the production of vermin , stinky odor and pathogenic vectors ,if not Managed correctly .it can cause food contamination , digestive , infectious and contagious illnesses.This article is a review on waste management based on producing waste, process, and disposal of disaster debris during natural disasters. The researchers show that the most of constructional rubbish, such as brick ,block, concrete, tile ,iron layers , prefabricated gypsum pieces are used in many different usages such as : covering soil of Waste disposal area , concrete filler and roads infrastructure , buildings' foundation, improvement of agricultural soil drainage And chemical fertilizer and compost additives The results show that for reaching a stable environment two actions must be done: First decreasing the extraction of raw material from natural resources And the other one , decreasing the pollutant arising from accumulation of these material in the nature. There are so many ways to dispel disaster debris however the most scientific and the most efficient way is recycling and further use .disaster debris arising from catastrophes are the problem, plus that they can be an opportunity for the employment of damaged society and reinforcement of urban substructure in future . This article is done as a review with the goal of considering the management of disaster debris during natural disasters, emphasizing the reduction of environmental pollutants.

Keywords: Disaster debris, Management, Recycling, Environment

Environmental Health Engineering; A Loss in the Health Ministry of IR Iran

Somayeh Yousefi

MSc Student, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (syousefi852@gmail.com)

Abstract

It is more than half a century since the environmental health engineering establishment; in recent years Contrary to the initial goals, the Ministry of Health, Treatment and Medical Education and the community, has ignored environmental health engineering. This article was not to find the culprit; maybe in this case we may blame the universe as well! Here, by review the existential philosophy and the importance of this field in the world; we have an overview of the establishment of this field in Iran. In a part of the article, we examined the knowledge of the medical sciences community about this field, the views of students and graduates of environmental health engineering towards the field, and at the end, reviewed the job and employment status of the field.

Key words: Environmental health engineering, Sanitation, Hygiene, Health

4th International and
23rd National Conference
on Environmental Health
2 - 4 March 2021
Yazd-Iran

Environmental Pollutants Biomonitoring

Presentations

Measurement and Health Risk Assessment due to Exposure to BTEX on the Staff of Municipal Wastewater Treatment Plant, Shiraz, Iran

Mansoreh Dehghani [1], Ehsan Gharehchahi [2], Amin MohammadPour [3], AliReza Abbasi [4]

[1] Shiraz University of Medical Sciences/School of Health and Nutrition, Department of Environmental Health Engineering; mandehghani@yahoo.com
[2] Shiraz University of Medical Sciences/School of Health and Nutrition, Department of Environmental Health Engineering; e.gharehchahi@yahoo.com
[3] Shiraz University of Medical Sciences/School of Health and Nutrition, Department of Environmental Health Engineering; amin.mp7777@gmail.com
[4] Shiraz University of Medical Sciences/School of Health and Nutrition, Department of Environmental Health Engineering; alireza.abbasi1986@gmail.com

***Corresponding author:** Mansoreh Dehghani

Abstract

The aim of this study was to assessing the health risk of BTEX in the municipal wastewater treatment plant (WWTP) in Shiraz, Iran. Air samples were collected in the area of grit chamber, aeration tank, sludge digester tank, near the office and control building, and at the distance of 1 kilometer from office and control building inside the WWTP by active method in two different seasons (summer and winter). The samples analyzed using gas chromatography. The Carcinogenic risk (CR) and risk index (HQ) was assessed using United States Environmental Protection Agency (U.S. EPA) method. Monte Carlo simulations were used to quantify the uncertainty of risk assessment related to exposure to BTEX. The results showed that in both summer and winter, the concentrations of ethyl benzene and xylene isomers in the air of WWTP units were zero or its concentration was not within the detection of the test method. The CRs were 1.74×10^{-4}, 1.92×10^{-4}, 1.14×10^{-4}, 1.66×10^{-4}, 1.66×10^{-4} for grit chamber, aeration tank, sludge digester tank, near the office and control building, and at the distance of 1 kilometer from office and control building, respectively and categorized as a cancer risk. The HQ values Benzene were ∃1, indicating that long-term exposure could represent a health risk. Based on the sensitivity analysis the most important effective parameters in assessing carcinogenic and non-carcinogenic risk were the concentration of Benzene.

Keywords: BTEX, Health risk assessment, Carcinogenic, Monte Carlo

A New Method for Identifying and Measuring Three Major Metabolites of Di (2-ethylhexyl) Phthalate in Human Urine Samples using Liquid-Liquid Microextraction and Gas Chromatography/ Mass Spectrometry; A Case study of Urine Samples from Children and Adolescents

Mohammad Mehdi Amin [1], Karim Ebrahim [1], Saeed Parastar [1,2], Saeed Rajabi [3], Habibeh Nasab [3], Alireza Nasiri[4], Majid Hashemi[1,3,4*]

[1] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences
[2] Department of Environmental Health Engineering, School of Medical Sciences, Khalkhal Faculty of Medical Sciences, Ardabil, Iran. saeed.parastar31@yahoo.com
[3] Department of Environmental Health Engineering, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; Email address: Saeedrajabi27@gmail.com, nhabibeh1399@gmail.com.
[4] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran.

***Corresponding author:** Majid Hashemi, Tel.: +983431325075, Fax: +983431325128; E-mail: mhashemi120@gmail.com; ma.hashemi@kmu.ac.ir

Abstract

Phthalates are chemicals that are used to make hard and brittle plastics as well as soft and flexible plastics. The negative effects of phthalates on human beings include endocrine disruptors, reduce sperm quality, reduced pregnancy duration, pregnancy reduction, asthma in children, hypertension, and learning and behavioral problems. Phthalates are rapidly metabolized to monoesters such as MEHP, MEP, MMP, MnBP, MEHHP, and MEOHP due to a half-life in the human body. These monoesters are excreted by urine; therefore, urine matrix is used for biomonitoring of phthalates in the human. The purpose of this study was to use a new method for evaluating the liquid-liquid microextraction method to determine the di (2-ethylhexyl) phthalate monoesters in the children and adolescents in Isfahan. In this method, acetonitrile and chlorobenzene were used as disperser and extractant to extract the studied monoesters, respectively. Analytes were determined by GC/MS. Results showed that the recovery and RSD of the used method were 55-109 and 6.2-13.2 percent, respectively. LOD and LOQ were 0.024-0.088 and 0.05-0.48, respectively. 140 females (57.9 percent) and 102 (42.1 percent) were males of 242 people studied population. MEHP, MEOHP, and MEHHP were observed in 99.6, 95.87, and 96.28 percent of the samples, respectively. The average concentrations of MEHP, MEOHP, and MEHHP in the study population were 151.7±143.8, 258.26±143.07, and 194.17±147.3, respectively, which show very high rates compared to other studies and requires attention and legislation in limiting the use of phthalate compounds.

Keywords: Biomonitoring, Urinary phthalates, Microextraction

An Analysis of Urinary Concentration of Parabens in Iranian Adolescents and Its Relationship with the Use of Personal Care and food Products

Yaghoub Hajizadeh [1], Ghasem Kiani Feizabadi [2,3*], Awat Feizi [4], Karim Ebrahimpour [1], Farjad Batebi [5], Mohammad Reza Montazeri [5]

[1] Environment Research Center, Research Institute for Primordial Prevention of Non-communicable disease, Isfahan University of Medical Sciences, Isfahan, Iran.
[2] Department of Environmental Health Engineering, School of Health, Semnan University of Medical Sciences, Semnan, Iran.
[3] Student Research committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
[4] Department of Biostatistics and Epidemiology, School of Health, and Psychosomatic Research Center, Isfahan University of Medical Sciences, Isfahan.
[5] Department of Environmental Health Engineering, Semnan University of Medical Sciences, Semnan, Iran.

*** Corresponding Author:** Ghasem Kiani Feizabadi, Email: ghasem_kia@yahoo.com, ghkiani@semums.ac.ir

Abstract

Parabens are used as antimicrobial preservatives in a wide range of personal care products (PCPs), foodstuffs, and pharmaceuticals. However, there are increasing evidences have linked paraben exposure to adverse health effects. Therefore, in the present study we aimed to examine the urinary levels of four common parabens including methylparaben (MP), ethylparaben (EP), propylparaben (PP), and butylparaben (BP) among a population of 100 Iranian adolescents. Moreover, the relationship between the urinary concentration of measured parabens with the use of 19 PCP and 18 food products was analyzed in this study. The frequency of detection of parabens varied in the 91-100% range. Mean concentrations of MP, EP, PP, and BP were 88.25, 7.62, 10.26, and 7.90 μg/L, respectively. The urinary concentrations of parabens were statistically different ($p<0.05$) among three categories of PCP users (low, medium, high). Significant associations were observed between urinary parabens and the use of some PCPs and food products. Users of sunscreen and lotion products had significantly higher urinary MP, EP, and PP (54-180% and 18-50%) compared to the no-users. The levels of measured parabens were 78-354% higher among the users of mouthwash than the non-users. The urinary MP and PP were 81-90% higher among body wash users in comparison to the non-users. The consumers of the dairy products had 42-236% higher levels of urinary MP, PP and PP. The consumption of processed foods was found to be associated with 70-74% higher urinary MP and EP levels. Moreover, sauce consumers exhibited 33-156% levels of urinary MP, EP and PP. There were also significant correlation between the urinary levels of PP and EP with the consumption of jam, urinary levels of EP and consumption of the chips / snack and urinary MP levels with the consumption of cookies (59-66%, 33%, and 49%, respectively). Based on the findings there are obvious relationships between the urinary concentration of measured parabens with the use of PCPs and foodstuffs among Iranian adolescents. This is the first study conducted on this matter and findings can serve as guidance for setting strategies to reduce paraben exposure among the adolescents.

Keywords: Exposure, Urinary parabens, Adolescents, Personal care products, Food Products

Monitoring of Changes in Gene Expression Levels Caused by Telecommunication Antenna Waves

Fatemeh Zakieh Tohidi

Medical Physics Department, Faculty of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran

***Corresponding author:** Fatemeh Zakieh Tohidi

Abstract

Background: The use of mobile phones and the possible adverse effects of radiation waves have caused concerns in human health. Considering the important known functions of the brain hippocampus, this study was designed to investigate the effect of radiation from telecommunication antennas on environmental health through changes in the expression level of carcinogenic genes.

Materials & Methods: In this study, 48 male rats in the form of 6 groups of 8 (one control group and five experimental groups) were used. Four test groups were exposed to 900 and 1800 MHz waves twice a day for 30 consecutive days for 30 consecutive days for 30 consecutive minutes, one hour, two hours, and four hours. Then, the hippocampus of mice was dissected and the level of gene expression was examined.

Results: The mean expression level of genes increased with increasing duration of irradiation up to one hour of irradiation and then decreased decreasingly. The ratio of gene expression levels in all experimental groups was greater than 1. The difference in gene expression levels in all groups was $p < 0.05$.

Conclusion: Radio waves of mobile phone antennas cause a time-dependent change in the level of gene expression in the mouse brain.

Keywords: Electromagnetic waves, Mice, Apoptosis

Association of Exposure to Bioaerosols with Inflammatory Biomarkers and Hematologic Parameters in Waste Workers

Ashraf Mazaheri Tehrani [1], Abdulrahman Bahrami [2], Mostafa Leili [1], Mohammad Bagher Miranzadeh [3], Jalal Poorolajal [4,5], Dostmorad Zafari [6], Mohammad taghi Samadi [1*], Amir Hossein Mahvi [7,8*]

[1] Department of Environment Health Engineering, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[2] Center of Excellence for Occupational Health, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[3] Department of Environment Health Engineering, School of Public Health, Kashan University of Medical Sciences, Kashan, Iran
[4] Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[5] Modeling of Non communicable Diseases Research Center, Hamadan University of Medical Sciences, Hamadan, Iran
[6] Department of Plant Protection, Buali University, Hamadan, Iran
[7] Center for Solid Waste Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran
[8] Center for Air Quality Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran

***Corresponding authors:** Mohammadtaghi Samadi, Email: samadi@umsha.ac.ir,
Amir Hossein Mahvi, Email: ahmahvi@yahoo.com

Abstract

Bioaerosol exposure is various health issues. Herein, we evaluated potential link between bioaerosols exposure and inflammatory biomarkers in municipal solid waste workers (MSWWs) of the landfill site and municipal solid waste transfer station (MSWTS) of Hamadan, Iran. Air sampling was conducted at six points around the landfill, two points of the MSWTS (), and one point in park as a control area during spring and summer 2019. We observed that high numberof airborne pathogens were related to active zone > leachate collection pond > downwind ($p < 0.001$), respectively. The highest fungal bioaerosols concentration belongs to species of Aspergillus wereAspergillus flavus (83.3%), Aspergillus niger, and Aspergillus fumigatus (75.0%), respectively. In addition, Staphylococcus species (> 75%) were found as the highest abundance of bacterial bioaerosols in all areas of study. Blood test results revealed that PLT, IgG, WBC, neutrophil, basophils, and hs-CRP were significantly increased in the exposure group. The level of PDW, MPV, and P-LCR in the exposed subjects had a decreasing trend compared to the control, but didn't reach a significant reduction. There was a significant difference in hs-CRP and WBC between current smoker non-smoker of exposure group. Overall, This data shown that exposure to bioaerosols can be related to the activity of open dumpsites, exposure to bioaerosolsassociated with higher hematologic and inflammatory marker in circulation, and also smoking and confounding factors plays an important role in both control and exposure groups.

Keyword: Air contamination, Bioaerosols, Landfill, Waste transfer station, Biomarker, Inflammatory

Environmental Pollutants Biomonitoring

Posters

The Effect of Exposure to Pesticides and Cardio-Metabolic and Fertility Markers in Greenhouse Workers in Hamadan: A Case Study

Mostafa Leili [1], Abolfazl Ghafouri-Khosrowshahi [2], Mohammad Taghi Samadi [1], Abdulrahman Bahrami [3], Jalal Poorolajal [4], Fateme Samiee [1*]

[1] Department of Environmental Health Engineering, School of Public Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, Iran.
[2] Departments of Medicinal Chemistry and Pharmacology and Toxicology, School of Pharmacy, Hamadan University of Medical Sciences, Hamadan, Iran.
[3] Department of Occupational Health Engineering, School of Public Health and Center of Excellence for Occupational Health, Occupational Health and Safety Research Center, Hamadan University of Medical Sciences, Hamadan, Iran
[4] Department of Epidemiology, School of Public Health and Modeling of Noncommunicable Diseases Research Center, Hamadan University of Medical Sciences, Hamadan, Iran.

***Corresponding author:** Fateme Samiee (E-mail address: samiee_fateme@yahoo.com).

Abstract

The aim of this study was to evaluate cardio-metabolic and fertility markers in greenhouse workers who are exposed to chronic exposure to pesticides. Participants included 90 greenhouse workers and 90 green space workers (control group). Comparisons of biochemical parameters showed significantly higher levels of blood glucose, high-density lipoprotein cholesterol (HDL-L), and thyroid stimulating hormone (TSH) in the group of workers. Our findings showed an association between exposure of greenhouse workers to pesticides and subclinical changes biochemical parameters.

Keywords: Pesticide, Greenhouse workers, Cardio-metabolic marker, Fertility marker

A Review of the Micro Plastics Fate in Urban Wastewater Treatment Plants

Reza Moasheri[1], Abdollah Rashidi Mehrabadi [2], Gholam Ali Haghighat [1,3*]

1 Ph.D. Student, Faculty of Civil, Water and Environmental Engineering, Shahid Beheshti University, Tehran, Iran.
2 Associate Professor, Faculty of Civil, Water, and Environmental Engineering, Shahid Beheshti University, Tehran, Iran.
3 Instructor, Department of Environmental Health Engineering, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran.

***Corresponding author:** Gholam Ali Haghighat, Email: haghighat.gholamali@gmail.com, Tel: +983443312812

Abstract

Microplastics (MPs) are the plastics with a diameter of 1-5 µm that considered as environmental pollution. Recent studies show that urban wastewater treatment plants are one of the sources of MPs to the environment.

This research is a review study that is mainly the result of searches in published book and papers of international scientific data bases and publishers such as IWA, Elsevier, Springer, Pub Med, Science Direct, Google Scholar and Wiley, with the combination of keywords of “Micro plastic", "Emission rate" and "Wastewater Treatment" and also the Statistics and reports of the nation water & wastewater engineering company.

These results demonstrate although conventional urban wastewater treatment plants are not designed to remove MPs, they have high removal efficiency (85-99%) to extinct them. In addition to the studies show the main removal of MPs in wastewater treatment plants, carry out by physical process and biological processes and disinfection have little effect on the removal. Despite the high removal efficiency of MPs in municipal wastewater treatment plants, their emission rate to the environment is high.

Due to the lack of comprehensive studies on the fate of MPs in municipal wastewater treatment plants in Iran, based on analysis from existence references, the average emission rate of MPs is estimated about 1.8×10^{10} MPs/day i, in current situation and it is predicted about 4.7×10^{10} MPs/day, by assuming the entire population of the country is covered by municipal wastewater treatment plants.

Keywords: Micro plastics, Wastewater treatment plants, Emission rate

Groundwater Vulnerability Assessment using Drastic Model Based on GIS Study Area of Golpayegan Plain - Isfahan Province

Banafsheh Goodarzi Nezhad [1*], bahareh Goodarzi Nezhad [2] Behnam Motamedi [3]

[1] Master of GIS and RS Environmental Research Center; banafshehgoodarzi@yahoo.com
[2] Expert wsp of Isfahan Water and Sewerage Company; baharehgoodarzi@yahoo.com
[3] Expert of Isfahan Water and Sewerage Company; behnammotamedi2015@gmail.com

Abstract

In this study, the vulnerability of Golpayegan plain aquifer was evaluated using Drastik model and GIS. In Drastik model, which is an index-overlap model, to produce vulnerable scores of different points of hydrogeological parameters affecting groundwater pollution at water depth, Net aquifer nutrition, aquifer environment, soil texture, topography, effect of unsaturated area and hydraulic conductivity have been used. Furthermore, nitrate data were used for the accuracy of the drastic model. The results of this model showed a 52% correlation with nitrate data. Therefore, to increase the accuracy of the model, the land use layer extracted from Sentinel 2 satellite images as the eighth layer was added to the model and a correlation of over 70% with nitrate data was concluded. Low and medium vulnerability models were noted in most of the Golpayegan region.

Keywords: Aquifer vulnerability, GIS, Golpayegan plain, Drastic model

The Synergistic Toxicity Effect of Sulfur Dioxide Coupled on Crystalline Silica Nanoparticles in Human Lung Fibroblast Cells

Fariba Abbasi [1], Mohammad Reza Samaei *[1], Hassan Hashemi [1], Amir SavarDashtaki [2], Abolfazl Azhdarpour [1], Mohammad Javad Fallahi [3], Mahrokh Jalili[4]

[1] Health Research Center of Shiraz university of medical science, Department of environmental health engineering, Shiraz University of medical science, Shiraz, Iran; faribaabbasi10@gmail.com
[2] Department of Medical Biotechnology, School of Advanced Medical Sciences and Technologies Shiraz University of Medical Sciences, Shiraz, Iran; dashtaki@gmail.com
[3] Department of Internal medicine, Shiraz University of Medical Sciences, Shiraz, Iran; Fallahi@gmail.com
[4]Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Mahro.jalili@gmai.com

***Corresponding author:** Mohammad Reza Samaei

Abstract

Background: The presence of various air pollutants in the environment causes humans to simultaneously encounter a set of them. Some of these pollutants, such as sulfur dioxide (SO_2), can accumulate and bond with suspended particles, and due to the surface activity and surface-to-volume ratio of high silica nanoparticles (SiO_2), it is necessary to investigate the synergistic health effects of these pollutants.

Objective: This study was investigated the synergistic effects of SO_2 coupling on SiO_2 on the cell proliferation and cellular uptake in human pulmonary fibroblasts (MRC-5 cell line) for the first time.

Materials and Methods: In this study, cells were cultured in DMEM high glucose medium at 37°C for 24 hours, and after three passages were treated with different concentrations of SiO_2 and SO_2. MTT analysis was used to determine the toxicity effects, and a lethal concentration of 50% (EC_{50}) was determined. The cellular uptake of SiO_2 determined using ICP-MS. Statistical analyzes including, descriptive statistics and differences between data were performed using t-test in MATLAB2018.

Results: The results showed that with the coupling of SO_2 on SiO_2, the surface and structural properties of the nanoparticles change and cause its functionalization with methylene and hydroxyl active groups. The results of the MTT assay showed that with increasing the concentration of nanoparticles and SO_2, the viability of cells decreased ($p<0.05$). Following the coupling of the nanoparticles, the EC_{50} reduced the simultaneous exposure from concentrations of 1.7 and 10 mM of SiO_2 and sulfur dioxide nanoparticles to the simultaneous exposure of 1 mM of both contaminants. Besides, due to the coupling of SO_2 on SiO_2, the cellular uptake rate of silica at the initial concentration of 1 mM increased from 4.95 to 5.36 ppm, and at the concentration of 7 mM, the cellular uptake rate increased from 6.82 to 7.37 ppm.

Conclusion: According to the results, with the accumulation of SO_2 on SiO_2, the toxicity of silica nanoparticles has increased significantly. Furthermore, the amount of silica nanoparticles entering the cell has increased, which can be effective in cell proliferation, health adverse cellular effect, and genetic effects.

Keywords: Synergistic Toxicity, Silica Nanoparticles, Sulfur Dioxide, Cellular uptake

Evaluation of Estrogen Hormones in Wastewater Samples of Kermanshah Province

Nazir Fattahi [1*], Masoud Moradi [2], Kiomars Sharafi [3], Meghdad Pirsaheb [4]

[1] Research Center for Environmental Determinants of Health (RCEDH), Kermanshah University of Medical Sciences, Kermanshah, Iran; Email address: nazirfatahi@yahoo.com
[2] Research Center for Environmental Determinants of Health (RCEDH), Kermanshah University of Medical Sciences, Kermanshah, Iran; Email address: mahfooz60@gmail.com
[3] Research Center for Environmental Determinants of Health (RCEDH), Kermanshah University of Medical Sciences, Kermanshah, Iran; Email address: kiomars.sharafi@gmail.com
[4] Research Center for Environmental Determinants of Health (RCEDH), Kermanshah University of Medical Sciences, Kermanshah, Iran; Email address: mpirsaheb@yahoo.com

*** Corresponding author:** Dr. Nazir Fattahi; Tel.: 09183364311

Abstract

Endocrine-Disrupting Chemicals (EDCs) are chemical compounds with the potential to create the negative effects on the human and animal endocrine system. The entering of these chemicals into the environment can have adverse effects on freshwater organism, ecosystem stability, and human health and has become a major public health concern in today's societies. Among the EDCs, steroid hormones, due to their more severe effects, are of particular concern. Based on the results of previous studies, the presence and distribution of estrogenic compounds in the environment have been widely reported in surface and underground waters, raw and treated sewages, soil, and sediment. In this work, the solid-phase extraction (SPE) combined with the deep eutectic solvent based dispersive liquid–liquid microextraction (DES–DLLME) has been developed as a high sensitive technique for the ultra preconcentration of estrogenic compounds in wastewater samples prior to their analysis by gas chromatography–mass spectrometry (GC–MS). This coupling not only allows for the extraction of compounds from complex matrices such as sewage and wastewater, but also provides very high enrichment factors. In this technique, a new deep eutectic solvent (DES) was prepared by blending citric acid monohydrate and 1-octyl-3-methylimidazolium chloride at a molar ratio of 1:1. Variables affecting the performance of both steps were thoroughly investigated. Under optimized conditions, enrichment factors and extraction efficiency are between 33000–41000 and 55–68%, respectively. The SPE–DES–DLLME provided a high enrichment factor for estrogenic compounds. The limits of detections (LODs) are in the range of 0.01–0.05 ng L^{-1} and calibration graphs are linear in the range of 0.03–50 ng L^{-1}. The values of relative standard deviation (RSD) for intra-day and inter-day based on seven replicate measurements of 0.50 ng L^{-1} of estrogenic compounds and 0.30 ng L^{-1} for internal standard in wastewater were in the range of 1.5–2.5% and 2.6–3.8% respectively. The relative recoveries of wastewaters which have been spiked with different concentrations of target compounds are 90–108%.

Keywords: Estrogenic hormones, Wastewater analysis, Gas chromatography–mass spectrometry, Solid phase extraction, Dispersive liquid–liquid microextraction

Heavy metals in the Muscle of Blue Crabs (Callinectes sapidus) in Strait of Hormuz and its Probabilistic Health Risk Assessment

Zoha Heidarinejad [1], Sommayeh Hoseinvandtabar[2], Yadolah Fakhri [*3]

[1] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences,
Tehran, Iran; Z_heidarinejad@yahoo.com
[2] Student Research Committee, Hormozgan University of Medical Sciences, Bandar Abbas, Iran; hoseinvandtabar72@gmail.com
3 Food Health Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

***Corresponding author:** Email : Ya.fakhri@gmail.com; Phone : +989216737245

Abstract

In the present study, concentration of heavy metals in the muscle of Blue crabs (*Callinectes sapidus*) from the Strait of Hormuz was analyzed and following the health risk in the consumers by uncertainty and sensitivity analysis in the Monte Carlo simulation (MCS) technique was estimated. 33 samples of male blue crabs and 25 samples of female blue crabs were collected in the Strait of Hormuz from May to September 2020 for the analysis of heavy metals Nickel, Lead, Cadmium, and Iron using a flame absorption spectrometer. The order of heavy metals in the in muscle male blue crabs was Fe (414.37±288.07
µg/kg.ww) > Pb (238.78±87.83 µg/kg.ww) > Ni (92.57±39.72 µg/kg.ww) > Cd (52.73±18.39 µg/kg.ww) and in female blue crabs Fe (461.16±320.56 µg/kg.ww) > Pb (230.79±125.59µg/kg.ww) > Ni (84.13±46.07 µg/kg.ww) > Cd (67.412±43.93 µg/kg.ww). The concentration of heavy metals muscle of male blue crabs and female blue crabs was not significantly different (P-value > 0.05). Uncertainty of non-carcinogenic risk revealed that P95% of total target hazard quotient (TTHQ) in the adult and children consumers due to ingestion male blue crabs was 5.30E-3 and 1.08E-3, respectively and P95% of TTHQ in the adult and children due to ingestion female blue crabs was7.05E-3 and 1.20E-3, respectively. Although the non-carcinogenic risk of blue crab was in the safe range, due to the increase in its consumption and the increase of pollution sources in the Persian Gulf, it is recommended to monitor PTEs in the muscle of Blue crabs.

Keywords: Potentially hazard elements (PHEs); heavy metals; Blue crabs; Marine foods; Probabilistic risk assessment

Urinary Levels and Composition Profile of Parabens and Their Implications for Human Exposure in Iranian Pregnant Women

Yaghoub Hajizadeh [1], Ghasem Kiani Feizabadi [2,3*], Awat Feizi [4], Karim Ebrahimpour [1], Farjad Batebi [5], Mohammad Reza Montazeri [5]

[1] Environment Research Center, Research Institute for Primordial Prevention of Non-communicable disease, Isfahan University of Medical Sciences, Isfahan, Iran.
[2] Department of Environmental Health Engineering, School of Health, Semnan University of Medical Sciences, Semnan, Iran.
[3] Student Research committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.
[4]Department of Biostatistics and Epidemiology, School of Health, and Psychosomatic Research Center, Isfahan University of Medical Sciences, Isfahan.
[5] Department of Environmental Health Engineering, Semnan University of Medical Sciences, Semnan, Iran.

*** Corresponding Author:** Ghasem Kiani Feizabadi, Email: ghasem_kia@yahoo.com, ghkiani@semums.ac.ir

Abstract

Parabens are widely used as preservatives in cosmetics, medicines, and foods due to its antimicrobial properties. Concerns have been raised regarding the estrogenic activity and potential endocrine disruption effects of parabens. Studies on monitoring of parabens exposure in the Iranian population are very scarce. This study was carried out to measure urinary concentrations of parabens, to estimate their daily intake and to identify some of the socio-demographic factors affecting exposure to these compounds. In this study, concentrations of methyl paraben (MP), ethyl paraben (EP), propyl paraben (PP) and butyl paraben (BP) were measured in urine samples collected from 95 Iranian pregnant women by gas chromatography-mass spectrometry. The frequency of detection of MP, EP, PP, and BP were 100, 86.3, 94.7, and 82.5%, respectively. The highest median concentration was 87.02µg/L for MP, followed by PP, EP, and BP with median concentrations of 15.58, 9.64 and 8.57 µg/L, respectively. Except for BP, which was 3-10 times higher in Iranian pregnant women than in other countries, concentrations of other urinary parabens were comparable to those in other countries. Furthermore, the highest daily intake (DI) was related to MP (median=16.47µg/kg-bw/day), which is less than the acceptable daily intake (ADI). In this study, a significant positive correlation was observed between urinary parabens. Regarding the socio-demographic variables, negative significant associations were observed between age and BP, BMI and EP as well as Parity and PP. On the other hand, Income and Smoking were significantly positive associated to MP, BP and EP, BP respectively. The urinary MP and BP concentrations were higher amongst the subjects with diploma education (P=0.003 and P=0.006, respectively), and during the spring urinary MP concentration was higher than other seasons. In summary, our results show that Iranian pregnant women are more prone to parabens and their urinary parabens concentrations are associated with socio-demographic factors. The study results could serve as a basis for evaluating the rate of exposure of Iranian population to parabens in future studies.

Keywords: Urinary parabens; Biomonitoring; Exposure; Pregnant women

Survey of Lettuce Consumption on Total Nitrate and Nitrite in Consumer's Saliva and Urine: A Case Study in Isfahan

Malihe Moazeni [1*], Sahar Gholipour[2], Afshin Ebrahimi [3]

[1] Student Research Committee, School of Health, and Environment Research Center Isfahan University of Medical Sciences; Isfahan, Iran Malihe_moazeni@hlth.mui.ac.ir
[2] Student Research Committee, School of Health, and Environment Research Center, Isfahan University of Medical Sciences; Isfahan, Iran sahar.gholipour71@gmail.com
[3] Department of Environmental Health Engineering, School of Health, and Environment Research Center, Research Institute for Primordial Prevention of Non-communicable Disease; Isfahan University of Medical Sciences, Isfahan, Iran. a_ebrahimi@hlth.mui.ac.ir

***Corresponding author:** Malihe Moazeni; Malihe_moazeni@hlth.mui.ac.ir

Abstract

Introduction: Nitrate is a compound with adverse effects on human health which can exist also in vegetables. The concentration of nitrate in these sources may depend on climatic conditions in different regions. The use of nitrogen fertilizers and irrigation with wastewater increases the amount of nitrate in vegetables. Among vegetables, lettuce is high in nitrate. This study aimed to determine the total nitrate and nitrite intake from lettuce consumption as a leafy vegetable, which was done in Isfahan.

Method: This study was designed as a crossover based on the randomized selection method. Twenty people participated in this study. Before lettuce consumption, the concentration of total nitrate and nitrite in the saliva and urine were measured. Then, the intake of total nitrite and nitrate due to lettuce consumption was investigated. The Griess colorimetric reaction was used for total nitrate and nitrite determination in samples.

Results: The mean of total nitrate and nitrite concentrations in saliva and urine samples after lettuce consumption were 0.78 and 1.38 mM, respectively. The results showed that lettuce consumption increased the concentration of total nitrate and nitrite in saliva and urine samples.

Conclusion: The results of this study show intake of nitrate from the leafy vegetables consumption, especially lettuce. This issue needs attention as results of the side effects of nitrate and nitrite intermediates such as nitrosamines.

Keywords: Nitrate, Nitrite, Saliva, Urine, Lettuce

Degradation of Insecticides from Aqueous Solutions by Photocatalytic Processes: A Systematic Review and Meta-Analysis

Mojtaba Yeganeh[1,2], Esmail Charkhloo[1,2], Hamid Reza Sobhi[3], Ali Esrafili[1,2], Mitra Gholami[1,2]*

[1] Research Center for Environmental Health Technology, Iran University of Medical Sciences, Tehran, Iran.
[2] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran.
[3] Department of Chemistry, Payame Noor University, Tehran, Iran.

***Corresponding author:** Mitra Gholami, gholamim@iums.ac.ir

Abstract

Photocatalytic processes have received significant attention over the last decades. This systematic study along with meta-analysis is aimed at reviewing a vast number reports on the application of the above-mentioned methods used for the degradation of Insecticides in aqueous solutions.

Initially, the relevant articles over the last decade (2011-2020) were selected for the meta-analysis and subsequently systematically reviewed. In addition, the statistical analyses were performed by the R software. All studies were carefully reviewed by two independent researchers. Following a thorough screening, 375 articles were found to be suitable. Of which, 93 were finally selected which met the required quantitative criteria.

The pooled results on the selected articles revealed that the photocatalytic processes have gained lots of interest among the researchers. Results of meta-analysis proved that the photocatalytic processes could remove Insecticides with an average acceptable degradation efficiency of 64.55%. The average pooled percent of photocatalytic processes for the degradation of organophosphates, pyrethroids and carbamates was 92.92 (95 % CI: 89.19-96.66), 98.76 (95 % CI: 96.28-101.24) and 96.22 (95 % CI: 92.62-100.61), respectively. The Q-statistic, I^2 statistic, and Tau^2 test all confirmed a high level of heterogeneity in this study. Finally, it was demonstrated that photocatalytic processes are highly appropriate for the degradation of insecticides from aqueous solutions.

Keywords: Systematic review, Meta-analysis, Photocatalytic processes, Insecticides.

Membrane Technology in Air Pollution Control: Perspectives and Challenges

Zahra Naghiloo[1], Sayeh Abbasi moroudi[2], Farzad Mohammadi[3], Amir Sheikhmohammadi[4], Esrafil Asgari[5*]

[1] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; zahranaghiloo76@gmail.com.
[2] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; saye.abbasi.moroudi@gmail.com.
[3] Alborz Province Water and Wastewater Company, Alborz, Iran; mohammadi_f6382@yahoo.com.
[4] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; a_sheikhmohammadi@khoyums.ac.ir.
[5] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; esrafil_asgari@khoyums.ac.ir.

***Corresponding author:** Esrafil Asgari

Abstract

The rapid growth of environmental awareness has increased strict regulations on air pollution control and has led to major developments in air filtration or purification technology. Membranes are one of the promising technologies for air purification due to their high efficiency, low cost, and easy to development. There are two types of air filtration membranes, one of which is electro-spun fibrous membranes and the other microporous polymer membranes due to their high efficiency in pollutant removal. Fibrous membranes consist of random fibers, micro or nanofibers, and are widely used to remove fine particles, such as aerosols. Meanwhile, microporous membranes have fine pores that are capable of removing particles and molecules such as toxic gases. In this paper, the role of membrane technologies in air pollution control is investigated and the functions of membranes are comprehensively presented. In addition, the development of membranes to improve filtration efficiency and reduce air flow resistance is also discussed.

Keywords: Filtration, Membrane, Air Pollution Control

The Significance of Hospital's Fungal Bio-Aerosols

Somayeh Yousefi [1], Masoomeh Askari [2], Zahra Tolabi [3], Mahmood Alimohammadi[4*], Ramin Nabizadeh[5], Mohammad Sadegh Hassanvand[6]

[1] MSc Student of Environmental Health Engineering, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; Syousefi852@gmail.com
[2] MSc of Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; m.asgari4377@gmail.com
[3] MSc of Environmental Health Engineering, Department of Environmental Health Engineering ,School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; Zahratolabi@gmail.com
[4] Professor of Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; m_alimohammadi@tums.ac.ir
[5] Professor of Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; rnabizadeh@tums.ac.ir
[6] Associate Professor of Department of Environmental Health Engineering, Academic Member of Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran; hassanvand@tums.ac.ir

***Corresponding author:** Mahmood Alimohammadi**;** m_alimohammadi@tums.ac.ir

Abstract

Air is the most essential human need to live. There are various microorganisms in the air, which caused to allergic and infectious diseases in human. Some of the microorganisms stick to the particle surface and move with them. These microorganisms, called bio-aerosols, include all pathogens, bacteria, fungi, and viruses that cause infections. Hospitals are suspected of infections due to Bio-aerosols and their human health effects in operation rooms. This study has investigated fungal bio-aerosols in Hospital. Aerosol sampling was passive in operating room air. First, culture plates were placed at room temperature, and the aerosol particles were deposited on the plates. Totally, during 60 days, 198 fungal samples had been collected and analyzed. Plates were transferred to the mycology laboratory and the fungi were isolated, identified, and counted. In the end, qualitative results were reported. The most identified fungi were Cladosporium, Aspergillus, and Penicillium, and the highest concentration of fungi was observed in orthopedic, ocular, mass, and cesarean sections, respectively. It is necessary to examination occupied places for the concentration of bio-aerosols .Fungi in operation rooms may grow in building materials and form micro colonies .Patients inhale spores from these colonies and suffered to infection. Therefore, the preparation of a comprehensive inspection and control program for hospital operating room air will be important and effective in reducing the costs imposed by nosocomial infections.

Key words: Air pollution, Bio-aerosols, Operating Room, Fungi

Catalytic Degradation of Humic Acid using Ultrasound Fe–doped TiO2 Hybrid System from Aqueous Solution

Hossein Kamani[1], Anis Jahantigh[2], Elham Norabadi[3], Mohadese Dashti Zade[4]

[1] Full Professor, Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran.
[2] Msc in Environmental health, Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran.
[3] Msc in Environmental health, Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran.
[4] Msc in Environmental health, Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran

***Corresponding author:** Anis Jahantigh

Abstract

Background and purpose: The removal of HA from Aqueous solution was considered due to adverse effects on humans and the environment. The ability of ultrasound-catalyst hybrid system in degradation of HA, and survey the effective parameters in degradation is the objectives of the present study.

Materials and methods: The characteristics of the synthesized catalyst investigated by SEM ،XRD and UV-DRS. The performance of the system in pollutant removal investigated using the OFAT method. The kinetics of the process, mechanism and the reusability of the catalyst were determined in optimized conditions.

Results: The results indicated that pH = 3, catalyst = 400 mg/L, HA concentration = 5 mg/L have best efficiency (74%). Superoxide and hydroxyl radicals were considered as the main cause of HA degradation. Catalyst stability was investigated in 5 replicates and verified. The reduction in TOC obtained 45%.

Conclusion: The overall results show that the ultrasound Fe–doped TiO2 hybrid system has partial promising performance in degradation of HA.

Keywords: Fe–doped TiO2, Heterogeneous catalyst, HA, Ultrasonic irradiation

The Efficiency of Different Steps of the Most Common Method for Disinfecting Vegetables to Reduce the Total Coliform and Fecal Coliform of the Most Consumed Edible Vegetables

Kiomars Sharafi [1,2,*], Nazir Fattahi [2], Masoud Moradi [2], Hamed Soleimani[3], Hooshmand Sharafi[4]

[1] Department of Environmental Health, School of Public Health, Kermanshah University of Medical Science, Kermanshah, Iran; Email: kiomars.sharafi@gmail.com
[2] Research Center for Environmental Determinants of Health (RCEDH), Health Institute, Kermanshah University of Medical Science, Kermanshah, Iran; Email: nazirfatahi@yahoo.com, mahfooz60@gmail.com
[3] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Science, Tehran, Iran; Email: hasulimany@yahoo.com
[4] Department of Food Hygiene and Quality control, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran. Email: Houshmand.sharafi@gmail.com

***Corresponding author:** Kiomars Sharafi, Email: kiomars.sharafi@gmail.com

Abstract

Introduction & Objective: It is evermore advisable to wash each fruit and vegetables before eating them to ensure they are clean. Accordingly, this study aimed to evaluate the efficacy of various stages of the most commonly used method for the disinfection of vegetables (in Iran) for reducing the total and fecal coliforms of the most consumed edible vegetables.

Materials and Method: 64 fresh vegetable samples (each vegetable sample included 200 grams) were randomly purchased from the fresh produce section of local markets in four different areas (Ferdowsi, Azadi Square, Dowlat Abad, and Maskan) of Kermanshah city in order to survey the efficacy of conventional disinfection method. Fifty grams of vegetable samples were used to evaluate each step. According to the standard methods, the initial analysis of total and fecal coliform was done before disinfection and after each disinfection step. Three steps of disinfection were as follows: first scrape & pre-wash of vegetables; the second stage, separation of parasites by 5-3 droplets of detergent per liter for 5 minutes; third stage disinfection of vegetables by calcium hypochlorite solution (with 200 mg/l free chlorine) for 5 min. Finally, disinfected vegetables were washed out with water. The efficiency of each stage was determined based on the difference in total coliforms and fecal coliforms before the disinfection stage and after each stage of the procedure mentioned above.

Results: In vegetables with more foliage and hidden holes (such as basil and onion), the fecal coliform amount did not reach zero even after all of the disinfection stages. Besides, according to this study's results, radish, onion, and coriander leaves had the highest contamination and lettuce had the lowest primary in terms of total and fecal coliform.

Conclusion: According to the results, it can be concluded that to achieve the highest efficiency in reducing microbial agents of vegetables, it is necessary to complete the different disinfection stages following its instructions.

Keywords: Edible vegetables, Disinfection of Vegetable, Total coliform, Fecal coliform

Evaluating the Potential of Mixed Fungal Culture for Decolorization of Cardboard Recycling Industry Wastewater

Zeinab Hosseini[1*], Mohammad Taghi Ghaneian[2], Abbasali Jafari Nadoushan[3], Mahin Ghafourzade[4]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Email: z.hosseini423@gmail.com
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Email: mtghaneian@ssu.ac.ir
[3] Department of Medical Parasitology and Mycoligy, Paramedical School Shahid Sadoughi University of Medical Sciences, Yazd,Iran; Email: jaabno@gmail.com
[4] Biotechnology Research Center, International Campus, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; E. mail: mgh.1537@yahoo.com

*** Corresponding author**: Zeinab Hossein

Abstract

Introduction: Cardboard recycling industry is one of the major industries producing wastewater in developed and developing countries. Bioremediation processes are economical and eco-friendly alternatives for industrial wastewater treatment. Therefore, this research aimed to evaluate the decolorization of the effluent from the cardboard recycling industry in Yazd, central province of Iran, using mixed fungal culture.

Materials and Methods: Firstly, the effluent samples from the cardboard recycling industry were cultured on potato dextrose agar medium to isolate native fungal colonies. The grown colonies were then identified using morphological macroscopic and microscopic characteristics in order to choose the dominant fungi for bioremediations. The mixed cultures of *Aspergillus niger, Aspergillus flavus and Penicillium digitatum* were finally used for bioremediation experiments of the cardboard recycling industry. A suspension containing 1×10^6CFU/ml of fungal spores was prepared from each fungus, separately and their homogenous mixture. Sewage samples were prepared and sterilized and used at 25%, 50% and 90% dilutions and pH levels of 5, 7 and 8 for bioremediation tests using mixed fungal spores. Following that, 10 ml of the mixed fungal spores were inoculated into the samples for decolorization and incubated for 10 days at 30 °C. The amounts of decolorization were measured before incubation and after 3, 6 and 10 days of inoculation. In this research, the color was measured by ADMI (American Dye Manufacturer Institute) by the closed reflux method. The results of the present study were analyzed using $SPSS_{21}$ statistical software and T-independent tests at p-value <0.05.

Results: The results of this research showed that the mean decolorization by mixed fungal culture over 10 days at pH levels of 5, 7 and 8 were 44.40%, 45.00% and 36.84%, respectively. Moreover, the mean decolorization at dilutions of 25%, 50%, and 90% were 45.00%, 31.93% and 30.53%, respectively. Therefore, the maximal decolorization efficiency was obtained at dilution of 25% and pH 7.

Conclusion: Given that limited studies have been conducted on bioremediation of the effluent from the cardboard recycling industry using fungal species, this research could provide useful information on the physicochemical properties of the effluent in this industry.

Keywords: Effluent, Bioremediation, Decolorization, Mixed fungal culture, Cardboard recycling

Phytoremediation of Heavy Metals from Polluted Environments

Ehsan Shamoogardiani [1], Saman Maleki [2], Nahid Navidjouy [3]*

[1] Department of Environmental Health Engineering, Urmia University of Medical Sciences, Urmia, Iran

***Corresponding author:** Nahid Navidjouy, Email: n.navidjouy@gmail.com

Abstract

One of the major environmental concerns is the spreading of municipal and industrial wastewater produced by human activities resulting in environmental pollution. Use of wastewater in agricultural soils causes transfer contamination to non-polluted areas by dust or crop consumption, especially vegetables. In addition, the Atmospheric downpours cause the wash of these lands, and as a result, pollutants along with the runoff enter the surface water resources, or through infiltration in the soil into groundwater, resources log in. Wastewater used for irrigating agricultural lands can contain heavy metals, especially if it originates from the electronics manufacturing industry, battery production lines, mining activities, plating, and metal smelting. Heavy metals can enter the body through ingestion, respiration, and skin contact. Various methods such as chemical deposition, coagulation and flocculation, buoyancy, ion exchange and bioremediation are available today for the decomposition and conversion of heavy metals into safe form. Phytoremediation is one of the In-situ bioremediation branches and is one of the green and environmentally friendly technologies that is economically Cost effective and is less expensive in terms of energy. Phytoremediation involves the absorption, deformation, accumulation, or evaporation of pollutants by plants, which can be used to purify most pollutants in water, air and soil. In addition to recognizing plants specific to the phytoremediation process and planting them in infected environments, humans can also increase their ability.

Keywords: Environmental pollution, Heavy metals, Phytoremediation, Environmentally friendly

Investigation of the Effect of Surface and Deep Aeration Methods on Density and Type of Bacterial and Fungal Bioaerosols in Municipal Wastewater Treatment Plant

Maryam Zare Bidoki [1*], Ahmadreza Yazdanbakhsh[2,3], Mehrnoosh Abtahi Mohasel[4], Mona Ghazi[5]

[1] MSc of Environmental Health Engineering, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[2] Professor, Workplace Promotion Health Resaerch Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3] Professor, Despartment of Environmental Health Engineering, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[4] Assistant Professor, Department of Environmental Health Engineering, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[5] Assistant Professor, Department of Microbiology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

***Corresponding author:** Maryam Zare Bidoki, MSc of Environmental Health Engineering, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran. zare.maryam92@gmail.com

Abstract

Background and purpose: Emission of bioaerosols from wastewater treatment plants is a potential hazard to human health. In this study aimed at investigating the effects of surface and deep aeration techniques on density and type of airborne bacteria and fungi in two municipal wastewater treatment plants.

Materials and methods: This descriptive cross-sectional study was done in two wastewater treatment plants in Tehran equipped with surface and deep aerations. Microbial samples were taken from air beside aeration tank, grit chamber, secondary sedimentation basin and two control points (upwind and downwind) every 6 days during summer and autumn 2017. Samples were analyzed for density of bioaerosols and types of bacteria and fungus applying standard methods.

Results: Wastewater treatment plant with surface aeration tank had the greatest effect on emission of bioaerosols than the plant with deep aeration. Mean values for density of bacterial bioaerosols and fungal emission were 6845 and 15784 CFU/m^2/h in summer and 535 and 899 CFU/m^2/h in autumn, respectively. Different gram-positive and gram-negative bacteria were identified in both wastewater treatment plants investigated.

Conclusion: According to current study, emission of bioaerosol in wastewater treatment plants with surface aeration is more than that of those with deep aeration and has greater potential hazard.

Keywords: bioaerosol, Mechanical aeration, Surface aeration, Wastewater treatment plant

Investigation of Heavy Metal Concentration in Liquid and Solid Lipsticks Offered in Kashan

Mohammad Rezvani Ghalhari[1], Mohammad Raeisi[1], Mohammad Babapour[1], Gholamreza Hoseindoost[2],Nayereh Rezaie Rahimi[3], Gholamreza Mostafaei*[,2]

[1] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
[2] Department of Environmental Health Engineering, Faculty of Public Health, Kashan University of Medical Sciences, Kashan, Iran
[3] Department of Environmental Health Engineering, School of Public Health, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract

Introduction: Human exposure to heavy metals and their absorption causes health problems. One of the ways heavy metals enter the human body is the use of cosmetics and especially the use of lipsticks contaminated with these heavy metals. The purpose of this study is to investigate the amount of heavy metals (lead, cadmium, nickel, and chromium) in lipsticks offered in Kashan.

Material and Methods: This is a descriptive study and was conducted in 2020. From 4 types of solid lipstick and 4 types of liquid lipstick available in Kashan cosmetics stores, 24 samples were randomly prepared. After preparing the samples by standard method, the amount of heavy metals was measured by ICP and their results were reported in micrograms per gram of sample weight.

Results: The results show that the concentration of lead heavy metal in lipstick code 111, which has an orange color and is in solid form, has the highest concentration. Furthermore, the results show that in lipstick with code 106, which has a bright pink color and is in solid form. Nickel and chromium have the highest amount and heavy metal cadmium was not found in any of the samples and there was a significant difference between the concentrations of nickel, chromium and lead in the products ($p < 0.001$).

Conclusion: Although the amount of lead and nickel in selected lipstick brands in this study was lower than the allowable limit, but their low concentration compared to the results of previous studies can have adverse effects through serious risks to human health and the possibility of disease exacerbation. Therefore, the preparation and use of these products should be done according to the existing standards.

Keywords: Heavy Metals, Liquid and solid lipsticks, Lipstick

Evaluation of the Water Safety Plan (WSP) Implementation and Risk Management in the Urban Water Supply System: A Case Study of Bandar Abbas

Emadaldin Shafiei [1], Farima Poudat [2], Hamid Reza Ghaffari [2], Zohreh Kamari [2,*]

[1] Bandar Abbas Water and Wastewater Company
email: Emadshafiei1657@gmail.com
[2] Department Environmental Health, Hormozgan University of Medical Sciences, Hormozgan, Iran
email: poudat.f3@gmail.com, ghaffarihrz@gmail.com, zohreh2310@gmail.com*

Abstract

Background and objective: Water safety plan (WSP) is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer. The objective of WSP is to ensure the safety of drinking water. This study was aimed to evaluate the water safety plan in one of the parts of Bandar Abbas drinking water supply system.

Methods: Information on the water supply system of Moghiran Zahuki complex in Bandar Abbas in 2018 was obtained from Bandar Abbas Water and Wastewater Company. In addition, some information was obtained through a field visit. Data analysis was performed using the water safety plan quality assurance tool developed by the World Health Organization (WHO).

Results: Out of 440 total points of the WSP, 247 points were obtained and 57.71% of the implementation was complied with the water safety plan. The lowest compliance (42.19%) was related to the step of the control measures monitoring and the highest compliance (100%) was related to the steps of team assembling, system description, and hazard and risk assessment.

Conclusion: According to the result, the important stages of drinking water safety plan such as hazard identification and risk assessment as well as improvement and upgrade program in the three main parts of the water supply system is currently at a high level of compliance. In addition, the overall performance of the plan can be improved by focusing on the operational monitoring phase and paying more attention to management methods.

Keywords: Drinking water, WSP, Risk Assessment

Evaluation of the Type and Concentration of Bioaerosols in the Air of Operating and Isolation Rooms of Hospital

Maryam Dashti[1*], Hadi Sadeghi[2], Mehdi Vosoughi[3], Seyed Ahmad Mokhtari[4]

[1] Department of Environmental Health Engineering, School of Public Health, Ardabil University of Medical Science, University of Medical Science Ardabil, Iran.
[2] Department of Environmental Health Engineering ,School of Public Health, Ardabil University of Medical Science, University of Medical Science Ardabil, Iran.
[3] Social Determinants of Health Research Center, Ardabil University of Medical Science, Ardabil, Iran.
[4] Department of Environmental Health Engineering ,School of Public Health, Ardabil University of Medical Science, University of Medical Science Ardabil, Iran.

***Corresponding authors:** Maryam dashti; E-mail address: Maryam.dashti59@gmail.com ; Tel.: +989125394028

Abstract

Hospitals are sensitive places because they can threaten the health of staff and patients or their companions. The aim of the present work was to evaluate the type and concentration of bacterial and fungal bio-aerosols in the indoor air of four operating rooms (ORs) and four wards in Khalkhal during 2019. Active sampling was performed in ORs and wards, and a total of 192 bacterial and fungal samples were measured. The mean total concentrations of airborne bacteria for both of ORs and wards limited between 11±1.2 to 48±3.1 CFU/m^3, while for airborne fungi ranged from 95±5.6 to 51±1.2 CFU/m^3. The predominant genera of airborne bacterial isolated in the indoor air of ORs vs. wards were *Staphylococcus epidermidis* (72% vs. 58%), *Group D Streptococcus* (4% vs. 17%), *Group A Streptococcus* (13% vs. 3%), and *Staphylococcus saprophyticus* (6% vs. 4%). In addition, the main fungal species identified in the indoor air of ORs vs. wards were *Cladosporium spp.* (37% vs. 38%), *Penicillium spp.* (28% vs. 22%), and *Aspergillus niger* (21% vs. 12%). A statistically significant correlation was observed between the mean concentration of bio-aerosols and population ($p < 0.05$). The results of statistical analysis reveals that a statistically significant difference exists between the mean concentrations of bio-aerosols and the values recommended by WHO ($p < 0.05$); this may be due to unsuitable and inadequate disinfection, improper design and operation of standard central ventilation (SCV), and high density of visitors and patients. Designing and operating appropriate of SCV, controlling density of visitors and patients, enforcing more precise, regular, and comprehensive disinfection methods, and supervising of waste, especially medical waste can boost reduction airborne fungi and bacteria in hospital.

Keywords: Fungi and bacterial; Bio-aerosol; Hospital; Operating room; Disinfection

A Review of Studies on Different Methods of Radioactive Waste Disposal with an Environmental Disaster Prevention Approach

Niloufar Borhani Yazdi [1], Ehsan Abouee Mehrizi* [2]

Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

***Corresponding author:** Email: ehsan.abouee@gmail.com Tel number: 09120203237

Abstract

The use of radioactive materials in nuclear power plants to produce energy and applying these materials in medicine, industry, research, and agriculture, like other industries, is associated with the production of waste. Due to the degree of toxicity, industrial and non-nuclear wastes are collected and disposed of with a very simple operation, however, because of their unique properties, radioactive waste needs to be stored and disposed of according to special criteria and after a series of operations. None of the problems facing the nuclear power industry are likely to be as great as the issue of radioactive waste and how it is disposed of permanently. Lack of proper waste management not only leads to the entry of radioactive materials into the environment and human body, but also causes adverse effects in the long run. In this article, initially, the general concept of issues related to nuclear energy and its importance, and then the types of radioactive waste and their disposal management based on the source of production and the characteristics of each group are expressed.

Keywords: Radioactive waste, Nuclear waste disposal, Management, Environment

COVID-19 and Air Pollution: Pollutants, Emission, Effects, and Management: A Review Study

Gholamreza Mostafaii [1], Mohammad Bagher Miranzadeh [2] ,Zahra Ghobakhloo [3], Safiye Ghobakhloo[4*]

[1] Department of Environmental Health Eng. Kashan university of medical sciences, Kashan. Iranmostafai_gr@kaums.ac.ir
[2] Department of Environmental Health Eng. Kashan university of medical sciences, Kashan. Iranmiranzadeh_mb@kaums.ac.ir
[3] School of Health, Guilan University of Medical Sciences, Rasht, Iran; za.ghobakhloo98@yahoo.com
[4] Department of Environmental Health Eng. Kashan university of medical sciences, Kashan, Iran. Sa_ghobakhloo@yahoo.com

***Corresponding author:** Sa_ghobakhloo@yahoo.com

Abstract

Understanding the link between the virus and air pollution could potentially lower the human death toll. Many studies have been performed to determine the effect of climate on the prevalence and severity of COVID-19 and vice versa. The present study is a review study conducted to understand the effect of climate and air pollution on mortality. New research indicates that air pollution could contribute to higher numbers of COVID-19 fatalities.Local climate plays an important role in the spread of the corona virus and resulting in mortality. It has been observed that increasing the temperature has a significant effect on reducing the number of COVID-19. Similarly, humidity is negatively correlated with the number of cases of COVID-19. Rainfall was unrelated while wind speed played a positive role in COVID-19 emissions. Sunlight threatens the survival of the virus, areas with less sunlight show high levels of exposure. A recent paper indicated that a higher prevalence and mortality of COVID-19 in Northern Italy could be partly explained by exposure to a higher level of air pollution. The paper concludes that the high level of pollution in Northern Italy should be considered an additional co-factor of the high level of lethality recorded in that area. The virus could be hitching a ride on PM particles. A recent paper suggests the coronavirus could be dispersed more widely on air pollution particles. Researchers in Northern Italy provided first evidence that Covid-19 virus can be found on particulate matter (PM). PM is already known to have negative effects on human health. The paper finds that COVID-19 burden seems more severe in areas with high concentrations of PM. Lockdown had a significant effect on stratospheric ozone concentrations.There are confounding variables at play making it difficult to pinpoint the exact causation: how air pollution affects the rates of mortality from Covid-19.

Keywords: COVID-19 , Pollutants, Environmental impacts

Survey of Concentration of Volatile Organic Compounds (VOCs) and Microbial Contaminants in the Indoor Air

Maryam Sarkhosh[2], Ali Asghar Najafpoor[3], Hosein Alidadi[3],Vahid Ghavami[4], Fatemeh Kariminejad[1], Mona Tabriziazad[1*]

[1] MSc of Environmental Health Engineering, Student Research Committee, Health Faculty, Mashhad University of Medical Sciences, Mashhad, Iran.
Kariminejzhad136618@gmail.com
[2] Assistant Professor, Department of Environmental Health Engineering, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran.
sarkhoshkm@mums.ac.ir
[3] Professor, Department of Environmental Health Engineering, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran.
NajafPoorAA@mums.ac.ir.
alidadih@mums.ac.ir.
[4] Assistant Professor of Biostatistics, Department of Epidemiology and Biostatistics, School of Health, Social Determinants of Health Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
Ghavamiv@mums.ac.ir.

***Corresponding author:** mona.tabriziazad2017@ gmail.com. Tel: 09337557595

Abstract

Background and Aim: Air pollution is often considered as one of the major causes of environmental health problems. Since volatile organic compounds (VOCs) and microbial contaminants are the most important causes of indoor air pollution. Therefore, this study was conducted to Survey of Concentration of Volatile Organic Compounds and Microbial Contaminants in the Indoor Air in the building of Mashhad Municipality. **Materials and Methods:** The present cross-sectional study was performed in the building of Mashhad Municipality. Sampling was performed using a Quick Take pump. The collected samples were then transferred to the laboratory using a cold box. After transferring the samples to the Laboratory of Environmental Chemistry and Microbiology, volatile organic compounds were evaluated using mass / spectroscopy (GC) tube equipped with mass spectrometry (MS) and microbial contaminants using TSA culture (Tryptic Soy Agar) medium.
Results: The results showed that the highest concentrations of volatile organic compounds were related to benzene, toluene, ethylbenzene, and xylene (BTEX) and also the highest microbial contaminants were related to Staph species. Aureus, Staphylococcus epidermidis and Klebsiella pneumoniae were the most common bacterial species.
Conclusion: Therefore, due to the high level of organic and microbial pollutants in buildings, the use of corrective and control measures, including the selection of appropriate buildings, the use of appropriate equipment and materials, to reduce pollution in the long run is essential.

Keywords: Indoor air quality, Volatile organic compounds, Microbial pollutants, Mashhad

Evaluation of Natural Radioactivity of Travertine Stones Supplied in Zahedan and Zabol

Hadi Nakhzari Moghadam [1*], Fatemeh zakieh Tohidi [2]

[1,2] Department of Medical Physics, School Of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran.

*** Correspondence**: Hadi Nakhzari Moghadam ;Email: h_nakhzari@yahoo.com

Abstract

Introduction: Humans in their environment are always exposed to radiation of various factors, including the radiation of radioactive materials in building materials. There is a small amount of radioactive elements in building materials, and due to the fact that humans spend about 80% of their time in building environments and are not far from these materials, the probability of radiation is high. This is a dosimetric study of Travertine stones used in buildings of two northern cities of Zahedan and Zabol provinces in 1399 in order to determine the relationship between stone color and their radioactivity.

Methods: By referring to the stone shops of Zahedan and Zabol cities, existing and consumable building stones were identified and a list of them was prepared. A total of 70 samples of travertine by MKS model pen dosimeter in three modes of determining the gamma dose rate (EDR) in terms of microsievert per hour; Determination of gamma equivalent dose (ED) was measured in milliseconds and beta flux density in parts per square centimeter per minute (part / cm2.min).

Results: The highest mean EDR in travertine rocks; Isfahan rock with a rate of 0.15 µSv / h and the lowest in Hajiabad rock with a rate of 0.01 µSv / h. The highest mean beta flux density was observed in travertine rocks in Isfahan rock sample at 0.0016 part / cm^2.min. Four samples of travertine stones had a beta flux density of zero. The ED value of all samples was set to zero.

Conclusion: The EDR rate for travertine stones in Isfahan and Abbasabad was higher than other types of stones. The highest beta beam flux density was observed in travertine 0.0016, which is less than the allowable limit. Furthermore, the mean EDR in travertine was 0.103 µSv / h, which is less than the allowable limit. The average value of beta beam flux density in the open air was zero. In all samples, the amount of ED was zero.

Keywords: Dosimetry, Travertine, Zahedan, Zabol

Removal of Benzene from Aqueous Solutions by Copper Oxide Nanoparticles during Ozonation Process

Leili Mohammadi[1], Razieh Khaksefidi[2]

[1] PhD of Environmental Health, Infectious Diseases and Tropical Medicine Research Center, Resistant Tuberculosis Institute, Zahedan University of Medical Sciences, Zahedan Iran. lailimohamadi@gmail.com
[2] Master of Environmental Health, Cellular and Molecular Research Center, Zahedan University of Medical Sciences, Zahedan Iran. r.khaksefidi110@gmail.com

Abstract

The current study aimed to examine the overall feasibility of the use of copper oxide nanoparticles as a catalyst in ozonation process for the removal of benzene from aqueous solutions under experimental conditions. This experimental study was conducted on a laboratory scale reactor in a semi- batch mode. The effect of critical operating parameters such factors as pH, concentration of benzene, reaction time and nano-catalyst dose on the removal of benzene was investigated. The samples included with benzene concentrations (10-200 mg/L), pH (3-13), catalyst dose (0.1-0.5 mg), and ozonation time (5- 50 min). Findings indicated that the removal of benzene depended on various utilization parameters. The highest efficiency was achieved at reaction time of 50 min, pH of 12, initial benzene concentration of 10 mg/L and catalyst dose of 0.5 g. Among the studied factors, the maximum and the minimum contributions were made by the dose of nanoparticles (83 percent) and the reaction time (~73 percent). The software predicted that use of 0.13 g of the catalyst at pH of 12 and ozonation time of 5 min would lead to a removal efficiency of 68.4 percent. The catalytic ozonation process was able to remove benzene, and addition of copper oxide nanoparticles as a catalyst together with the ozonation process increased the benzene removal efficiency. The values of R2 = 0.9972, adjusted R2= 0.9946, and predicted R2 =0.9893 indicated that the model was acceptably predicted by the software and fitted the data obtained in the experiments.

Keywords: Aqueous solution; Benzene; Catalytic ozonation; Copper oxide nanoparticles (CuO-NPs); Nano-catalyst.

Application of Modified Pistachio Shell Ash using Zncl2 to Adsorb Methylene Blue from Aqueous Media

Razieh Khaksefidi[1], Leili Mohammadi[2]

[1] Master of Environmental Health, Cellular and Molecular Research Center, Zahedan University of Medical Sciences, Zahedan Iran. r.khaksefidi110@gmail.com
[2] PhD of Environmental Health, Infectious Diseases and Tropical Medicine Research Center, Resistant Tuberculosis Institute, Zahedan University of Medical Sciences, Zahedan Iran. lailimohamadi@gmail.com

Abstract

Complex structure of dyes makes them more stable and more difficult to remove from water and wastewater. Consequently, it is essential to remove dyes from colored wastewaters before discharging them into the water resources. At present study, activated carbon obtained from Pistachio-nut shell ash was used as a cheap adsorbent for the removal of Methylene blue (MB) dye from synthetic solutions. In this laboratory study, the effect of critical parameters such as initial concentration of dye, reaction time, adsorbent dosage and pH was investigated. In addition, the adsorption parameters were determined based on Langmuir and Freundlich isotherms. Maximum adsorption capacity of the activated carbon obtained from Pistachio-nut shell ash was 155.6 mg/g at pH 8, initial concentration of 80 mg/L and 20±2°C temperature, when 97.25% of the dye was removed. Furthermore, it was found that the data fitted to Freundlich (R^2=0.9522) better than Langmuir (R^2=0.8934) model. According to the findings of this study, Pistachio-nut shell ash could be used for effective removal of MB as a cationic dye from colored wastewaters.

Keywords: Cationic dye, Adsorption, Pistachio-nut shell wastes, $ZnCl_2$

Investigating the Possibility of Effluent Reuse from Industrial Wastewater Treatment Plants to Provide Sustainable Water; A Case study: Nasirabad Industrial estate, Tehran

Behnam Behzadi Makvandi*[1], Mohammad Reza Elmi[2], Saeed Shojaee Barjoee[3], Mohammad Taghi Ganeian[4], Bahman Kiani[5]

[1] MSc, Department of Environmental, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran; Email address: behzadi.behnam@yahoo.com
[2] Assistant Professor, Department of Environmental, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran; Email address: melmi@yazd.ac.ir
[3] MSc, Department of Environmental, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran; Email address: said.shojaee71@gmail.com
[4] Professor, Department of Environmental, Department of Environmental Health, School of Health Shahid Sadoughi University of Medical Sciences, Yazd, Iran, Email address: mtghaneian@ssu.ac.ir
[5] Associate Professor, Department of Environmental, School of Natural Resources and Desert Studies, Yazd University, Yazd, Iran; Email address: bnkiani @ yazd.ac.ir

***Corresponding author:** Behnam Behzadi Makvandi

Abstract

The purpose of this research is to determine the quality of wastewater from the Nasirabad Industrial zoom and the possibility of reuse of it, which has been one of the methods of sustainable water supply. Sampling and experiments were carried out on the wastewater of the refinery in 2017. To determine the possibility of reuse of wastewater in irrigated green area, average values of pH, COD, BOD, TSS, TDS and heavy metals parameters were measured to Iran's Department of Environment and WHO standard. Data analysis was performed by Analyze of Variance (ANOVA) and Duncan average comparison in SPSS software. In order to determine the possibility of reuse of wastewater in the industry, the average values of pH, COD, TSS, TDS, manganese, iron, silica, chloride, sulfate, hardness and alkalinity parameters were measured and classified by industrial water. Based on the results, the average values of TDS 1861.5 and 5 mg / L and heavy metal arsenic were, respectively, which are not within the permissible limits according to the Iran's Environmental Protection Agency and WHO standards. The values of parameters in different seasons were significantly different and in summer the values of pH and TSS were higher, the COD, BOD, and DO values were more in the autumn, as well as in the spring, more TDS values. In terms of industrial water classification, the studied wastewater was in the fourth group (with the lowest sensitivity) and in terms of water resources quality with a score of 45.5 in group B (in terms of medium quality industrial use). The results showed that the studied quality parameters of the wastewater of the studied treatment plant, except for TDS and arsenic, are within the standard and permissible limits for irrigation of green space.

Keywords: Wastewater, Wastewater treatment, Reuse, Nasirabad industrial park

Monitoring of SO_2 and NO_x Changes in the Areas around Combined Cycle Power Plant of Qom by Passive Sampling Method when Changing the Fuel Consumption of the Power Plant

Reza Fouladi-Fard [1*], Mohammad Raza Hosseini [2], Fatemeh Pourkazemi [2], Kazem Naddafi[3]

[1] Research Center for Environmental Pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran; rfouladi@muq.ac.ir , rezafd@yahoo.com
[2] Student Research Committee, Qom University of Medical Sciences, Qom, Iran; m.reza68.h@gmail.com, fateme.kazemy@gmail.com
[3] Center for Air Pollution Research (CAPR), Institute for Environmental Research (IER), Tehran University of Medical Sciences, Tehran, Iran, knadafi@tums.ac.ir

***Correspondence:** rfouladi@muq.ac.ir

Abstract

The aim of this study was to measure the concentration of SO_2 and NO_X and its relationship with the variables of changing seasons and fuel consumption of Qom Combined Cycle Power Plant, in three stations around the power plant in December 2014 to May 2015. In this study, passive sampling was performed in three areas of Pardisan, Mahdieh, and Saqheh station and then the results were analyzed using Excel, SPSS and ArcView (GIS) software. The results showed that the mean (standard deviation) of NO_X concentrations measured in winter and spring were 40.86 (19.54) and 18.63 (5.32) $\mu g/m^3$ and the mean (standard deviation) of SO_2 concentrations in winter and spring were reported (0.50) 4.64 and 3.79 (0.79) $\mu g/m^3$, respectively. The highest mean concentrations of NO_X and SO_2 among the three stations when the power plant consumed gas oil were related to Pardisan station (53.30 $\mu g/m^3$) and Mahdieh station (4.97 $\mu g/m^3$), respectively. As such, there was a significant correlation between NOx and SO_2 concentrations when the power plant consumed gas oil (Spearman rho coefficient 0.68, $P < 0.05$), and a significant relationship was reported between plant fuel change and increase of NOx and SO_2 concentrations ($P < 0.05$). In conclusion, The use of alternative fuels by power plants such as gasoline and Fuel oil in cold temperature conditions that do not provide sufficient gas fuel for power plants will significantly increase the pollutants emitted from the power plant and therefore to the surrounding areas. Timely storage of gas to supply fuel in winter should be considered to avoid fuel shifts. Furthermore, utilization of process and emission control systems is effective in improving the emission of pollutants from power plants.

Keywords: Natural gas, gas oil, NOx, SO_2, Thermal power plant, Fuel change, Air pollution

Investigation of Heavy Metal Concentrations in Pasteurized Cheeses Offered in Gorgan

Ali Zafarzadeh [1], Ziaeddin Bonyadi [2], Mahboubeh Gholizadeh [1]

[1]Environmental Health Research Center, School of Health, Golestan University of Medical Sciences, Gorgan, Iran
[2] Department of Environmental Health Engineering, Social Determinants of Health Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

***Corresponding author:** Tel: +98-5138552613, Fax: +98-5138552613 E-mail address: zyabonyadi@yahoo.com

Abstract

Since milk is a complete food and a source of protein, fat and essential minerals such as calcium, phosphorus and magnesium that are essential for everyone, so the health of milk and its products is very important. This study was performed to determine the concentration of zinc, cadmium, lead, and copper in cheese supplied in Gorgan in 2016. In this descriptive-analytical study, 60 samples of cheese were selected from from 4 different brands (Kaleh, Pegah, Sabah, and Nasim) in Gorgan. The samples were collected in equal proportions during the two seasons of autumn and winter. The results of this study were determined using Spss23 and Excel2016 software with a 95% confidence interval (α = 0.05). The results showed that the mean concentrations of zinc, cadmium, lead, and copper in the studied cheese samples were equal to 8.97, 0.05, 0 and 0.34 mg / kg. The concentrations of the heavy metals lead and cadmium in cheese were too high and zinc and copper were too low concentration. High concentrations of the heavy metals cadmium and lead in cheese can pose health risks to consumers. High concentrations of the heavy metals cadmium and lead in cheese and butter can pose health risks to consumers.

Keywords: Zinc, Cadmium, Lead, Copper, Cheese

4th International and
23rd National Conference
on Environmental Health
2 - 4 March 2021
Yazd-Iran

Environmental Health Indicators

Presentations

Developing Environmental Health Quality Index for Iran based on Causal Effect Model

Mohammad Maroosi [1], Alireza Mesdaghinia [2], Mahmoud Alimohammadi[2] Kazem Nadafi[2], Amirhossein Mahvi[2], Ramin Nabizadeh[2]

[1] Neyshabur University of medical sciences, Environmental health engineering department.
[2] Tehran University of medical sciences, public health school, Environmental health engineering department.

Abstract

Background and Objective: Monitoring and reporting the environmental health status and its effect on health are considered one of the tasks of the health system. Formulating the indicators representing a relationship between environmental and health factors, in addition to support for environmental health program policy making, shows the process of effect of these factors on health via simplifying various data in the form of quantitative and understandable indicators for people and policy makers. In this study, the general framework for formulating environmental health quality index for Iran is presented.

Method: This indicator was implemented at two levels of determining indicator domains and domain specific variables. The domain specific variables were selected based on the modified DPSEEA model from the list of national and international variables.

Results: Seven environmental health issues (air quality, drinking water, sewage disposal, food, housing and human settlements) were determined and three variables were selected for air quality, 8 variables for water, 5 variables for sewage disposal, 1 variable for food, 3 variables for housing and human settlements, 4 variables for waste management and 3 variables for radiation management.

Discussion: Determining environmental health indicators based on the causal effect model leads to better understanding of the relationship of environment and health by simplifying a large number of data in an understandable format for people and policy makers to improve the prioritization of policy making in the environmental health domain.

Keywords: Environmental health quality index, Air quality, Water quality, Waste management

Survey of Microbial Quality of Municipal Solid Waste Compost and its Comparison with the Standard Values

Sepideh Sadeghi [1], Amir Hossein Nafez [2], Farzaneh Mohammadi [3], Sahar Gholipour [4], Mahdi Hadi [5], Mahnaz Nikaeen [6*]

[1] MSc Student of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; Diba13740@gmail.com
[2] Assistant Professor of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran; amirnafez@hlth.mui.ac.ir
[3]Assistant Professor of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran; fm_1363@yahoo.com
[4] PhD student of Environmental Health Engineering, School of Health, Kashan University of Medical Sciences, Kashan, Iran; sahar.gholipour71@gmail.com
[5] Assistant Professor, Department of Environmental Health Engineering, School of Health, Tehran University of Medical Sciences, Tehran, Iran; M-hadi@sina.tums.ac.ir.

[*6] **Corresponding Author:** Professor of Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; nikaeen@hlth.mui.ac.ir

Abstract

Introduction: The quality of final compost reveals how the composting process proceeds in the removal of indicator microorganisms and pathogens. The aim of this study was to investigate the microbial population of municipal solid waste (MSW) compost and compare it with the national and international standards.

Methods: A total of 37 MSW samples (including three sub samples each about 100 g) were collected during the use of MSW compost (mid-December to mid-April) in public areas of Isfahan. Compost samples were tested for microbial (adenovirus, fecal streptococcus, fecal coliform, *Escherichia coli*, *Clostridium perfringens* and its spores, *Salmonella* and *Shigella*) and physicochemical parameters (germination index, pH and moisture). For Salmonella, Shigella, and *Clostridium perfringens*, suspected colonies were tested by polymerase chain reaction (PCR). Adenovirus was also detected and quantified by using real-time PCR methods with specific primers**.**

Results: The results of MSW compost study showed that *Salmonella* and fecal coliforms were higher than the standard in %8 and %27 of the samples, respectively. Among the bacterial characteristics, Streptococcus faecalis was present with high concentrations in all samples of MSW compost. A high number of samples were positive for adenoviruses, while *Shigella* was not found in any of the samples tested. *Clostridium perfringens* and *E. coli* were obtained at concentrations of 51 and 32 MPN per dry weight, respectively. Based on the results, no association was observed between bacterial and viral characteristics. Germination index with an average of 33.72 was lower than the proposed standard of germination index in Iran.

Conclusion: Our results showed that the composting process has not worked well in eliminating indicator and pathogenic microorganisms. Failure to pass the maturation and stabilization stage or failure to reach the high temperature in the thermophilic phase of the composting process can be the reason for the presence of these microorganisms or their regrowth in the compost. Therefore, responsible organizations must be more careful in carrying out the process of composting of MSW

Keywords: Compost, Municipal solid waste, Indicative microorganisms, Pathogens

Monitoring of Heavy Metals in Industrial Solid Waste and Soils around Industrial Areas: Health and Environmental Risk Assessment

Hamid Karyab [1], Fateme Dehghan [2], Zahra Hamidi[3], Sheida Zakariaei[4], Fahime Farmani[5]

[1] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvin, Iran; Email address: : hkaryab@qums.ac.ir
[2] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvin, Iran; Email address: fatemeh.dhg77@gmail.com
[3] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvin,
Iran; Email address:zahrahamidi75@gmail.com
[4] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvi, Iran; Email address: sheida.zakaria73@gmail.com
[5] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvin,
Iran; Email address: fahime.farmanie@gmail.com

Abstract

Introduction: Since toxic heavy metals can pose serious challenges to the environment and human health, this study was conducted to identify heavy metals concentration (including lead, cadmium, chromium, nickel, cobalt and mercury) and environmental and health effects from hazardous industrial solid wastes and polluted soils in Qazvin province.

Methodology: The identification of hazardous industrial solid wastes was carried out in accordance with the Basel Convention. Heavy metals were analyzed by atomic absorption spectrometry. Environmental epidemiological method was used to assess the risk assessment of exposure to heavy metals. After determining the exposure to heavy metals, ecological and health risk assessment was performed. Probabilistic procedures were used in estimation of excess lifetime cancer risk (ELCR) and hazard quotient (HQ). In addition, the ecological risk assessment was done to estimate accumulation rate, pollution coefficient and risk indexes attributed to identifies heavy metals.

Results: According to the Basel Convention, the obtained results showed that most industrial hazardous solid wastes are produced in solid form including sludge and processed soils. Lead was found in the highest concentration, followed by Cadmium and chromium, in the analyzed samples. The highest degree of environmental pollution index was related to the sludge from industrial wastewater treatment plants. Estimated ELCR attributed to exposure to heavy metals from inhalation was lower than the acceptable risk level provided by WHO; however, ELCR in dermal exposure was higher the acceptable risk level. Also, the HQ from inhalation of heavy metals was estimated less than one; whereas in dermal exposure was higher than one.

Conclusion: Based on the obtained results, it can be concluded that identified heavy metals in industrial solid waste and the surface soils can pose serious pollution in the study area, so that the ecological risk associated with the heavy metals, especially lead, was very high. In addition unlike the inhalation, it was revealed that exposure to heavy metals through dermal contacts can have significant health effects.

Keywords: Industrial solid wastes, Heavy metals, Polluted soils, Ecological risk, ELCR, HQ

Characterization, Possible Sources, and Health Risk Assessment of PM2.5-Bound Heavy Metals in the most Industrial City of Iran

Majid Kermani[1, 2], Ahmad Jonidi Jafari[1,2], Mitra Gholami[1,2]Ali Abdolahnejad[3], Kazhal Masroor[4], Mahmood Yousefi[2], Masoumeh Tahmasbizadeh[5], Farzad Fanaei[2*]

[1] Research Center of Environmental Health Technology, Iran University of Medical Sciences, Tehran, Iran;
[2] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran; majidkermani@yahoo.com
[3] Department of Environmental Health Engineering, Maragheh University of Medical Sciences, Maragheh, Iran. abdolahnejad.a@gmail.com
[4] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; kazhal.masroor1993@gmail.com
[5] Department of Environmental Health Engineering, School of Public Health, Isfahan University of Medical Sciences, Isfahan, Iran mtahmasbi946@gmail.com

***Corresponding author:** Farzad Fanaei, Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran.
Tel.: +989016457815; Fax: +98 21 88622707 E-mail address: farzadfanaei37@gmail.com

Abstract

Air pollution associated with particulate matters results in different types of disease including allergy, lung destruction, heart failure, and related problems. This study has been designed and performed to examine the concentration of $PM_{2.5}$-bound heavy metals, risk assessment, possible sources, and effect of meteorological parameters on 17 sites of the air of the most industrial city of Iran (Karaj) in 2018-19. For this purpose, four samples were taken from every point of Karaj air over one year using a pump (Leland Legacy (SKC)) with flow rate of 3 L/min on PTFE filter for 24 h. Overall, 68 samples of $PM_{2.5}$-bound heavy metals were collected. In sampling, atmospheric parameters including temperature, pressure, humidity, and wind speed were regularly recorded using PHB318 portable device. In examining the chemical composition of these particles, the concentration of metals (Al-Zn- Ar-Cd-Cr-Cu-Fe-Hg-Mn-Ni-Pb) was determined after digestion of the collected samples and through injection into ICP-OEC device. The results indicated that the mean annual concentration of $PM_{2.5}$ particles range from 21.84 to 72.75 µg/m^3. The mean concentration of heavy metals lied within the range of 25.63 to 336.27 ng/m^3. Among heavy metals, the maximum concentration belonged to aluminum (277.95 ng/m^3) and iron (336.27 ng/m^3), which are known as elements with a ground source (sources such as car fuels, exhaust gases, decorative materials, batteries, indoor smoking, the paint used for painting walls, erosion and corrosion of rubber of cars). Meanwhile, there was a positive relationship between heavy metals and temperature(r: 0.418, p<0.019), pressure (r: 0.184, p<0.0.402), as well as wind speed (r: 0.38, p<0.017), while an inverse relationship was observed with relative humidity (r: -0.219, p<0.018). The ecological risk of the metals calculated was very notable, with the maximum environmental risk being related to cadmium in children (6.61) and manganese in adults (0.82). The largest HQ in children and adults was associated with Cr. Finally, ILCR values for cadmium in both children (1.19 E-04) and adult (4.81 E-04) groups indicated high risk of developing cancer in humans.

Key Words: Ambient Air, Health Risk, Heavy Metals, Karaj City, PM2.5

Investigation of the Presence of Microplastics in the Sediments of Talar and Tajan Rivers in Mazandaran Province

Mohammad Ali Zazouli[1], Reza Dehbandi[2], Zeinab Rasouli*[3], Nouraddin Mousavinasab[4], Yahya Esfandiari[5]

[1] Professor, Department of Environmental Health Engineering, Faculty of Health, Mazandaran University of Medical Sciences,Sari, Iran(zazoli49@yahoo.com)
[2] Post-doctoral Researcher, Health Sciences Research Center, Department of Environmental Health Engineering, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran(rezadehbandi65@gmail.com)
[3 *] MS Student in Environmental Health Engineering, Student, Mazandaran University of Medical Sciences, Sari, Iran,
[4]Associate Professor, Department of Biostatistics, School of Health, Mazandaran University of Medical Sciences, Sari, Iran(snmn1337@yahoo.com)
[5] Laboratory expert, Department of Environmental Health Engineering, Faculty of Health, Mazandaran University of Medical Sciences,Sari, Iran(esfandyari496@gmail.com)

***Corresponding author:** zeinabrasouli1526@gmail.com

Abstract

Introduction & Objective: Plastic pieces are considered as global problems that have different types of environmental, social, aesthetic, and economic effects. Small plastic pieces, fibers, and granules called "microplastics", plastic pieces with a diameter between 1 -5 mm is considered as large microplastics and 1 mm smaller particles are considered as small microplastics due to their small size. Microplastics can be swallowed by small organisms through water and food and transported in the food chain between invertebrates, birds, and mammals, including humans. After accumulating, they accumulate in the gastrointestinal tract, reducing actual consumption. Food, hunger, and even death come alive. There is relatively limited information about the presence of microplastics in the river environments of the world and the available information about the rivers of Iran is very limited. The purpose of this study was to investigate the presence and frequency of microplastics in the sediments of Tajan and Talar rivers in Mazandaran province.

Methods: Twenty six samples of sediment were removed from 5 bed points of each of the two rivers, Talar and Tajan in Mazandaran province. The microplastics were identified using a stereo light microscope. The type of polymers forming the selected microplastics were determined by micro-Raman device and surface composition and appearance by electron microscope equipped with EDAX devic.

Results: The average number of microplastics in all samples in the sediments of Talar and Tajan rivers of Mazandaran was 164.9 cases per kilogram. Ethylene terephthalate (PET), polypropylene (PP) and high density polyethylene (HDPE)

Keywords: River, Sediments, Microplastic, Tajan, Talar

Investigation of Concentration of Fungi Aerosols in Air of Isfahan City

Hossein Karimi [1], Mahnaz Nikaeen* [2], Maryam Hatamzadeh[2], Sahar Gholipour[2], Akbar Hassanzadeh[3] & Yaghoub Hajizadeh[2]

[1] 1Student Research Committee and Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.
[2] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.
[3] Department of Statistics and Epidemiology, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.

***Corresponding author:** E-mail address: nikaeen@hlth.mui.ac.ir, Tel.: +983137923278

Abstract

Introduction: Considering the importance of health effects of particulate matter (PM)- associated bioaerosols and significance of PM as a major cause of air pollution in many cities, including Isfahan, as well as increasing the number of heart and respiratory diseases due to the air pollution in recent years: this study was conducted to determine the species and concentration of fungi aerosols in the air of Isfahan.

Methods: In order to determine the fungi aerosols, quartz filters were used to collect $PM_{2.5}$ by PQ200, and phosphate buffer in impinger was used to collect all particles. A total of 39 samples were collected during one year. Fungi aerosols were identified using culture method.

Results: Mean values of $PM_{2.5}$, UV index, wind speed, temperature, and humidity were 56.34 µg /m^3, 5, 2.87 m /s, 21.38 و and 25.71%, respectively. There was a significant difference between the mean concentration of total fungi sampled by PQ200 and Impinger ($P < 0.05$). The mean concentration of total fungi, *Penicillium*, *Aspergillus*, black fungus and yeast in samples of PQ200 were 4.37, 1.51, 1.05, 2.03 and 0.28 CFU /m^3, respectively. The results also showed that the mean concentrations of the studied fungi by the impinger sampling method were 12.87, 1.38, 0.63, 5.19 and 5.17 CFU /m^3, respectively.

Conclusion: Our findings showed that, although the study area is sometimes exposed to relatively high concentrations of PM, the concentration of fungi associated with the $PM_{2.5}$ particles was relatively low. The results also showed that with increasing particle size, the concentration of fungi increases, indicating less association of these bioaerosols with $PM_{2.5}$ particles and consequently their health effects.

Keywords: Bioaerosol, Fungi, Isfahan

Heavy Metal Contamination and Health Risk Assessment in Agricultural Soils, NorthWest Iran

Amir Mohammadi[1*], Maryam Faraji[2,3], Sepideh Nemati Mansour[4], Ali Abdolahnejad1, Mohammad Miri[5]

[1] Department of Public Health, Environmental Health Engineering, Maragheh University of Medical Sciences, Maragheh, Iran.
[2] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran.
[3] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran.
[4] Department of Environmental Health Engineering, School of Public Health, Tabriz University of Medical Sciences, Tabriz, Iran.
[5] Non-communicable Disease Research Center, Department of Environmental Health Engineering, Sabzevar University of Medical Sciences, Sabzevar, Iran.

*** Corresponding Authors:** Amir Mohammadi, mohammadiurm@gmail.com

Abstract

Heavy metals accumulation in surface soil has become a global concern. The aim of this study was to investigate of heavy metals level and health risk assessment of exposure to arsenic, cadmium, cobalt, copper, chromium, lead, nickel and zinc through ingestion, dermal, and inhalation pathways, around of Lake Urmia in agricultural land in NW Iran. Assessment of soil pollution and source identification was done with enrichment factor and Pearson correlation. The order of heavy metal concentrations was: Zn > Cu > Ni > Co > Pb > Cr > As >Cd with mean 68.66, 35, 31.66, 15, 14.4, 11.2, 7.04, and 0.26 mg/kg, respectively. These values are in allowable range of Iran-EPA guideline values. A strong positive correlation was found between Cd with Co and Cu with Pb. The mean EF values for As, Cd, Co, Cr, Cu, Ni, Pb and Zn extracted 2, 1.9, 1.8, 1.2, 1.7, 1, 2.8, and 1.3, respectively. These ranges of EF suggest minor enrichment for metals and sources influence may be related to anthropogenic activity. The mean values of lifetime cancer risks (LTCR) for oral, dermal, and inhalation exposure pathways to heavy metals were in the negligible risk levels. The ingestion contact pathway had the highest LTCR between three mentioned exposure pathways. The hazard index was found to be < 1 through total pathways exposure. Moreover, the sensitivity analysis revealed that the exposure duration(ED) for As, exposure frequency (EF) for Cd and Ni, concentration $_1$ (C_{soi}) for Cr and Pb have the highest impact on LTCR values. Our finding confirmed that heavy metals concentration special As and Cr in surface soil around of Lake Urmia was possible associated with the health risk and this finding could be useful for area planners and decision-makers.

Keywords: Heavy metals, Surface soil, Lake Urmia, Health risk

Environmental Health Indicators

Posters

Designing and Technico- Economic Feasibility Study of Implementation of Underground Solid Wastes Collection System in Karaj City

Elnaz Zarezadeh [1], *Mohammad Nourisepehr [2], Aliakbar Roudbari[3]

[1] M.Sc. Student, Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Karaj, Iran
[2] Professor, Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Karaj, Iran
[3] Associate Professor, Department of Environmental Health Engineering, School of Public Health, Shahroud University of Medical Sciences, Shahroud, Iran

***Corresponding author:** Elnaz Zarezadeh. E-mail: zarezadehshmu@gmail.com

Abstract

The aboveground waste bins are considered as one of the components of mechanized solid waste collection systems. However, these bins have many challenges, including the overflow caused by the few numbers of reservoirs, visual pollution, incompatibility of the bins with the urban furniture, vulnerability of the bins to corrosion and fire, and the residents' dissatisfaction, etc. In recent years, the underground solid waste collection has been proposed to respond to the problems of aboveground systems. In this method, the bins located under the ground are larger than the aboveground bins. These bins eliminate most of the problems caused by the aboveground bins. The present study aims to determine the technical requirements and the implementation costs of underground systems for the collection of household wastes in Karaj. The present research is a descriptive-analytical study investigating the waste collection systems of Karaj for six months. The research goal is to analyze and compare the current aboveground waste collection system of Chahrbandi Boulevard in Mehrshahr (Karaj) with the underground collection system in terms of the technical and economic aspects. The research stages include the following: referring to the Urban Service Department of Karaj Municipality to get the information of the bins located in Chahrbandi Boulevard, designing the underground waste collection system for Chahrbandi Boulevard, estimating the operational costs of the underground waste collection system, and comparing the current (aboveground) system with the underground system in terms of technical aspects. According to the results, in the aboveground waste collection system, the total costs of the initial investment are equal to 1772298000 Tomans, and the total costs of the ten-year operation period are equal to 5156406506 Tomans. In the underground waste collection system, the total costs of the initial investment are equal to 1267236800 Tomans, and the total costs of the ten-year operation period are equal to 4095305226 Tomans. The cost analysis suggests that both the initial investment cost and the ten-year operation cost of the underground waste collection system are lower than those of the aboveground system.

Key words: Underground collection, Feasibility, Technical, Economic, Karaj

Assessment of Soil Pollution Level and Ecological Risk of Heavy Metals in the Soil of Zarand, Iran

Maryam Faraji [1,2,*], Mohammad Malakootian [1,2] , Amir Mohammadi [3] , Mahsa Hasanzadeh [1,2]

Maryam Faraji: [1] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran ; [2] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; m.faraji@kmu.ac.ir. m_faraji28@yahoo.com.
Mohammad Malakootian: [1] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran ; [2] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; m.malakootian@yahoo.com.
Amir Mohammadi: [3] Department of Public Health, School of Nursing and Midwifery, Maragheh University of Medical sciences, Maragheh, Iran; amahammadi@gmail.com.
Mahsa Hasanzadeh: [1] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran ; [2] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran; m20568h@gmail.com.

***Corresponding author:** Maryam Faraji. m.faraji@kmu.ac.ir. m_faraji28@yahoo.com.
Address: Kerman University of Medical Sciences, Medical University Campus, Haft-Bagh Highway, Kerman, Iran. Postal Code: 7616913555. Tel: (+98-34) 31325103.

Abstract

Heavy metals can be entered to the human body via inhalation, ingestion and dermal contact. Their presence in the soil threats public health due to entry to the food chain and accumulation in different organs. This study aimed to assess soil pollution level and ecological risk of heavy metals (Cd and Pb) in the soil of Zarand, Iran. Soil samples were collected from 45 different points in August of 2020. Heavy metals were detected by inductively coupled plasma equipped atomic emission spectrometry detector (ICP-AES). Pollution degree was characterized through enrichment factor (EF), contamination factor (CF), geo-accumulation index (Igeo) and potential ecological risk (PER). The mean values of metals were 0.27±0.02 mg/kg and 9.60±4.27 mg/kg for Pb and Cd, respectively. According to the EF index, both Cd and Pb could be classified in the moderate enrichment class. But 5% of Pb had significant enrichment in the soil samples. Also, Cd and Pb were respectively categorized in the unpolluted and low to moderate pollution category. Two classes uncontaminated to moderately contaminated and uncontaminated could be associated to the Cd and Pb respectively according to the Igeo index and comparison to the Earth's crust. In term of the PER index, all samples could be classified at low risk category. No ecological hazards were observed from soil samples in the study area in the period of the study. The improvement of the fuels quality used in the motor vehicles and industries, control of dust storm and management of pesticide usage in the agricultural is suggested to control soil pollution sources in the Zarand city.

Keywords: Soil pollution, Heavy metals, Potential ecological risk

Survey on Bacterial and Fungal Agents of Nosocomial Infections in Obstetrics and Gynecology Hospital Air

Nezam Mirzaei[1*], Najimeh Nasiri[1,2], Hossein Akbari[3], Sahar Gholipour[1,2] Ali Koolivand[4], Hamid Abtahi[5], Mojtaba Didehdar[6], Arezou Rezaei[7]

[1] Department of Environmental Health Engineering, Social Determinants of Health (SDH) Research Center, Kashan University of Medical Sciences, Kashan, Iran.
[2] Student Research Committee, Kashan University of Medical Sciences, Kashan, Iran.
[3] Department of Biostatistics and Public Health, Social Determinants of Health (SDH) Research Center, Kashan University of Medical Sciences, Kashan, Iran.
[4] Department of Environmental Health Engineering, Faculty of Health, Arak University of Medical Sciences, Arak, Iran.
[5] Depatrment of Medical Mycology and Parasitology, Medicin Faculty, Arak University of Medical Sciences, Arak, Iran.
[6] Department of Microbiology, Faculty of Medicine, Arak University of Medical Sciences, Arak, Iran.
[7] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

***Corresponding author:** Nezam Mirzaei, nezammirzaei@yahoo.com

Abstract

Bacterial and fungal bioaerosols are a global concern due to nosocomial infections, especially in developing countries. Our study aimed to detect fungal and bacterial bioaerosols in different wards of an obstetrics and gynecology hospital air samples. 240 bioaerosol samples were collected by performing impaction method from different wards of a hospital in the central part of Iran, during two seasons. Fungi genera and bacteria species are recognized by cultivation. Concentration of fungi and bacteria were ranged from 44 to 75 CFU/m^3 and 8 to 22 CFU/m^3, respectively. No significant difference between microbial load of wards which used natural ventilation and heating, ventilating, and air conditioning (HVAC) system was observed. The microbial load was not affected significantly by temperature, working shift, and Inpatient Bed Occupancy Rate (IBOR). Fungal load related significantly with relative humidity. *Staphylococcus aureus* and *Penicillium* were the most predominant isolated bacteria and fungi, respectively. The results revealed that the level of bacteria and fungi responsible for nosocomial infections in the air of this hospital is very low. Although levels of microbial contamination are relatively low, it is important to investigate the effect of bioaerosols on nosocomial infections, especially in neonates.

Keywords: Nosocomial infection, Indoor air pollution, Bioaerosol, Bacteria, Fungi

Environmental Health Status, Physicochemical, and Microbiological Quality of Swimming Pools in Sirjan and comparison with Standards

Fatemeh Parsaee[1*], Zhila Honarmandrad[2]

[1] BSc Student of Environmental Health Engineering, Department of environmental health engineering, Sirjan School of Medical Sciences Email address (fatemeh.parsaei1375@gmail.com)
[2] Tutor of Environmental Health Engineering, Department of environmental health engineering, Sirjan School of Medical Sciences; Email address (zhilahonarmandrad@yahoo.com)

***Corresponding author:** fatemeh parsaee,09164014802, Department of environmental health engineering, Sirjan School of Medical Sciences

Abstract

Introduction: Many diseases are transmitted to swimmers by swimming in pools due to not observing health, poor conditions of swimming pool and inappropriate disinfection. The aim of this study was Survey of environmental health status, physicochemical and microbiological quality of swimming pools in Sirjan and comparison with standards

Methods: In this study, 162 samples were taken from 9 indoor swimming pools of Sirjan. Then environmental health status, pH, residual chlorine, turbidity, temperature, and coliforms were measured. Sampling was done at the first 6 months of the year. All of the experiments were performed according to standard methods of water and wastewater. Data analysis was carried out using descriptive statistics

Results: From 162 samples the amounts of pH 100%, turbidity 76.19%, residual chlorine 70.6% and coliforms 90.41% corresponded with standards and with survey of environmental health status most of items except ventilation system, proportional number of swimmer with number of showers and toilets were 75% and 85% corresponded with standards, respectively.

Conclusion: According to results, the health quality of swimming pools was proper but some of them are need continual monitoring.

Keywords: Swimming pools, Environmental health status, Circulating system, physicochemical and microbiological quality

Selecting Water Supply Sources in Disasters and Emergencies

Aman Allah Zamani [1], Hamid Reza Abbasi [2*], Vali Alipour [3], Mahmoudreza Peyravi[4], Payam Shojaei[5], Ali Goli[6], Leila Mohammadinia[7], Vajihe Shamsaei[8]

1 Health Human Resources Research Center, Department of Health in Disasters and Emergencies School of Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran. E-mail: irana53@yahoo.com

[2 *] Assocciate Professor, Trauma Research Center, Shahid Rajaee (Emtiaz) Trauma Hospital, Shiraz University of Medical Sciences, Shiraz, Iran (Corresponding author). E-mail: abbasimezy@gmail.com

[3] Assocciate Professor, Environmental Health Engineering, School of Health, Hormozgan University of medical sciences, Bandar Abbas, Iran. E-mail: v_alip@yahoo.com

[4] Department of Health in Disasters and Emergencies, Health Human Resources Research Center, School of Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran. Email: peyravi110@gmail.com

[5] Associate Professor, Department of Management, Shiraz University, Shiraz, Iran E-mail: pshojaei@shirazu.ac.ir

[6] Associate Professor in Regional Planning, Department of Sociology & Social planning, Shiraz University, Shiraz, Iran. E-mail: goli@shirazu.ac.ir

[7] Health Human Resource Research Center, Department of Health in Disasters and Emergencies, School of Management and Information Sciences, Shiraz University of Medical Sciences, Iran. E-mail: leyla.mohammadinia@gmail.com

[8] Environmental Health Department, Bandar Abbas health center, Hormozgan University of medical sciences, Bandar Abbas, Iran. E-mail: vajiheshamsaei64@gmail.com

***Corresponding author:** Hamid Reza Abbasi

Abstract

Introduction: Disasters are recognized as one of the most significant risks that can severely impact infrastructure-heavy systems, such as water systems. Water utilities provide essential lifeline functions to communities and individuals, but are often at risk when natural disasters strike. Natural disasters are a growing concern given increased frequency and economic damages. Therefore, it is essential for utilities to prepare as more frequent and intense weather incidents are predicted to occur.

Objective: The purpose of this study is to design and validation Instrument for selecting drinking water resources in disasters and emergencies.

Method: A systematic review of reputable databases was conducted and effective criteria and sub-criteria to select alternative water sources in emergencies and disasters were extracted. The results were sent to 40 Specialists and experts (In the field of water, disasters, environmental health, and environment). After final summarizing experts comments, the main criteria, and sub-criteria were designed as instrument. Validity and reliability of instrument were performed in three ways, including content validity (content validity ratio, content validity index), face validity and structural validity.

Results: Instrument has 9 main criteria and 44 sub-criteria's. Main criteria include Environmental factors, Economic factors, Regional geographical factors, General characteristics of water treatment system, Technical characteristics of Water treatment systems, General characteristics of water resources, Non-toxic chemical of water sources, Toxic chemicals of water sources, Physical and biological characteristics of Water resources.

Conclusion: This instrument can help officials and decision makers to plan for drinking water supply from disaster-prone areas water resources before disasters occur.

Key Word: Instrument, Water, Disaster, Emergency

Assessing the Status of Sustainability and Performance of Environmental Health Indicators in Different Parts of the World

Mohammad Ali Zazouli [1], Alireza Ala [2]

[1] Professor, Department of Environmental Health Engineering, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran
[2] Ph.D. student in Environmental Health Engineering, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran

***Corresponding author:** Alireza Ala, Email: ala_alireza@yahoo.com

Abstract

Introduction: Environmental factors play a quarter of the role in disease burden. Therefore, controlling environmental factors and paying attention to environmental health indicators play an important role in preventing many diseases. Therefore, the purpose of this article is to review the environmental health indicators and the degree to which countries protect their populations from environmental health risks.

Materials and Methods: This simple review study analyzes various texts and sources around the world that examine global environmental health indicators, as well as their regional performance and global trends.

Results: According to the results of this study, the average global performance of environmental health in the indicators studied in 2020 is 43.66%. Sustainability status of environmental performance from different regions of the world in each of the indicators of drinking water health, heavy metals, climate change, air quality, waste management, and wastewater treatment, respectively, 53.68, 51.52, 50.13, 42.50, It was 37.71 and 26.44 percent.

Conclusion: The lag in environmental performance in the world is prominent to protect countries from their population against environmental health risks. Correction of policy options in this area is necessary.

Keywords: Global indicators, Environmental health, Air quality, Waste management, Drinking water hygiene

Evaluation of Microbial Contamination of Food Preparation Surfaces in Kerman Restaurants

Mohsen Mehdipour [1], Mostafa Shamsaddini[2] , Rahim Aali [3*]

[1]Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran and Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran. E.mail: mmehdipoor@kmu.ac.ir
[2]MSc student, Department of Environmental Health Engineering, Kerman University of Medical Sciences, Kerman, Iran .shamsmos1365@gmail.com
[3] Environmental Health Engineering Research Center, Qom University of Medical Sciences, Qom, Iran and Department of Environmental Health, School of Health, Qom University of Medical Sciences, Qom, Iran. Email: aali1400@gmail.com (*Corresponding author)

Abstract

Introduction: Food-borne illness is a major international problem and an important cause of reduced economic growth. Restaurants are the main source of food-borne infections and poisoning, employees of food production and distribution centers play an important role in occurrence of disease.

Materials and methods: This cross-sectional descriptive study was conducted in 2019 to evaluate the microbial status of Kerman city restaurants. In this study, 137 restaurants from three types of public restaurant, hall restaurant and hotel restaurant were investigated. To identify the type of bacteria, the samples were sent to the laboratory and a special cultures medium was used to determine the type of bacteria.

Results: In 37 restaurants, the level of microbial contamination was lower than 10 RLU, and in 100 restaurants, the level of microbial contamination was above 10 RLU, which in 24 cases of these 100 restaurants, no microbial mass growth was observed after specific microbial cultures. The number of positive cultures of Escherichia coli, Salmonella, Staphylococcus aureus, Klebsiella, and Gram-positive bacilli were 22, 5, 12, 12, and 34, respectively.

Discussion and Conclusions: Food preparation and sales centers, especially restaurants and kitchens, are places that have a significant impact on the spread of food-related diseases. Observance of standards and criteria of personal health of the operators and employees of the above centers, public health and environment in which food is prepared and produced, including raw and cooked food, How to supply and maintain used food, equipment and supplies that are directly related to public health is an inevitable necessity .The results of this study showed that microbial contamination of food preparation surfaces in Kerman restaurants is in the unfavorable condition.

Keywords: Restaurant ، Food preparation Surface ، Microbial contamination, Food safety

Assessment of Groundwater Quality in Kashan City using Water Quality Index and Sodium Absorption Rate for Drinking and Agricultural Water

Mohammad Rezvani Ghalhari[1], Benyamin Ajami [1], Esfandiar Ghordouei Milan [1], Amir Hosein Mahvi *[1,2]

[1] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
[2] Center for Solid Waste Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran.

***Corresponding author:** Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran , 09215355148

Abstract

Introduction: Groundwater is the main source of water for drinking and agriculture in arid and semiarid regions. Rainfall, land use, structure, geology, mineralogy of the aquifer and duration of water contact with the surroundings in the basement of the main factors are affecting the quality of groundwater chemical. To assess the quality of drinking water and agricultural water quality index (WQI) and sodium adsorption ratio (SAR) is used. This study aimed to evaluate the quality of drinking water and agricultural Kashan.

Materials and Methods: In this study Sampling was conducted from 71 wells so physical and chemical parameters were examined and by using mathematical methods the SAR and WQI were calculated. So, collected data were analyzed by using SPSS-16, Excel 2013 software, and Statistical tests.

Results and Discussion: The results show that the amount of sodium, sulfate, chloride, calcium bicarbonate ions, dissolved solids and electrical conductivity higher than World Health Organization standards. The water quality index was 44.94 and water quality was excellent in 67% of samples. It was also found that the use of well water for agricultural use is no problem in terms of physical and chemical parameters and SAR levels in all samples were in the S1 class.

Conclusion: The presence of salt marshes and Qom Salt Lake was the effect on Kashan groundwater quality. Using groundwater of Kashan wells for drinking and agricultural water use is appropriate. Of course, if you use too much groundwater is used for agricultural purposes, due to changes in the quantity of water to dissolve the sodium concentration of NaCl is much that can increase the amount of SAR and causing damage to the soil in the future.

Keywords: Drinking water, Agricultural, Groundwater, WQI, SAR

Investigation of the Status of Disinfectants used in Hospitals in Kashan in 2019-2020

Hassan Rahmani [1*], Masoume Kazemi Meshkani [2], Faezeh Asgari Tarazoj [3]

[1] Assistant Professor, Department of Environmental Health Engineering, Faculty of Health, Kashan University of Medical Sciences, Kashan, Iran.Hs.rahmani@yahoo.com.
[2] BS student in Environmental Health, School of Health, Kashan University of Medical Sciences, Kashan, Iran. kazemi.m.1721@gmail.com.
[3] Master student of Environmental Health, Faculty of Health, Kashan University of Medical Sciences, Kashan, Iran. Fa.asgari374@gmail.com.

Abstract

Background and purpose: Hospitals are the center of infection transmission due to their special conditions. In order to reduce and eradicate microorganisms from the equipment and the environment in the hospital, proper cleaning, disinfection and sterilization methods are required, which requires the use of antiseptics and disinfectants, and these methods should be with a specific type of disinfection for the possibility of contamination. The aim of this study was to investigate and analyze the types of disinfectants used in Kashan hospitals.

Materials and Methods: The study method is descriptive-cross-sectional. Kashan hospitals were selected in December 2019 by simple random sampling and the relevant checklist was completed. The required information was collected and analyzed by interviewing an environmental health expert and observing different parts of the hospital and visiting the antiseptic and disinfectant warehouse.

Results: Due to the type of services provided and the possible resistance of the existing microorganisms, the studied hospitals use certain types of disinfectants, and similarities were observed in the use of those disinfectants among the hospitals. The studied hospitals used about 70% of the disinfectants produced in the country and the rest of the disinfectants used at the time of the study were imported. Bleach and sayasept -*HP* were the most widely used disinfectants.

Conclusion: The results of this study showed that although holding training courses on the principles of environmental health of the hospital is one of the operational programs of the Infection Control Committee, but because disinfection is performed by service personnel and paramedics, informing them as much as possible about the incidence And the prevalence of nosocomial infections, the importance, loss of life and property caused by these diseases and the effective role of these people in the optimal elimination of environmental pathogens and consequently the reduction of nosocomial infections are necessary.

Keywords: Disinfection, Nosocomial infection, Pathogen

Evaluation of Production and Industrial Waste Management Model in Metal and Non-Metallic Mineral Industries in Qazvin Province

Hamid Karyab [1], Zahra Hamidi [2], Fatemeh Dehghan [3]

[1] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvin, Iran; Email address: hkaryab@qums.ac.ir
[2] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvin, Iran; Email address : zahrahamidi75@gmail.com
[3] Department of Environmental Health Engineering, Health Faculty, Qazvin University of Medical Sciences, Qazvin,
Iran; Email address: fatemeh.dhg77@gmail.com

Abstract

The spread of industrial activity with the production of large and diverse amounts of industrial waste, especially the production of hazardous waste has caused negative effects on the environment and it's a threat to human health. Metal and non-metallic industries are active industrial groups in the country that have a significant share in the production of industrial waste. The purpose of this study was to investigate the quantity and pattern of industrial waste management in Qazvin province. In this study, a researcher-made questionnaire was formed by a panel of experts to assess the management of industrial waste, using the elements of waste management, including temporary storage, minimization, recovery, recycling, collection, transfer, treatment, and final disposal in 107 industrial units. In metal industries (79 industries) and non-metallic minerals (28 industries) were studied. The quantification of industrial waste was carried out by weighting and identification of specific wastes in accordance with the provisions of the Basel Convention. The total industrial waste was 4635291 kg / month in metal industries and 1107910 kg / month in non-metallic minerals. The per capita production of industrial waste in metal and non-metallic minerals industries was 0.64 and 0.04 kg per ton of product, respectively. According to the findings of the special waste study, it constitutes a significant contribution of industrial waste. This share was 30% and 25% in the group of metal and non-metallic minerals, respectively. Examination of the industrial waste management model showed that on average 38% of the waste is processed and recycled and the rest is managed without a specific pattern. According to the study, 97% of industries operate waste landfills in the uncovered environment. This behavior causes soil pollution and the possibility of groundwater, so the establishment of isolated and covered temporary storage of industrial waste in industry is mandatory. The findings of the study also show that mechanization of industrial waste collection and transportation system and automation of industrial waste management process to accurately track the process of industrial waste management and identify their fate, especially special waste, which can reduce the environmental effects associated with the production of industrial waste.

Keywords: Industrial wastes, Special industrial wastes, Metal industries, Machine building and electronics, Non-metallic mineral industries

The Law and Regulation Procedure and its Impact on Waste Management in Iran

Rahim Aali[1], Zahra Naghiloo[2], Sayeh Abbasi Moroudi[3], Amir Sheikhmohammadi[4], Esrafil Asgari[5*]

[1] Department of Environmental Health Engineering, Research Center for Environmental Pollutants, Qom University of Medical Sciences, Qom, Iran; . R.Aali@muq.ac.ir.
[2] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; zahranaghiloo76@gmail.com.
[3] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; saye.abbasi.moroudi@gmail.com.
[4] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; a_sheikhmohammadi@khoyums.ac.ir.
[5] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran. esrafil_asgari@khoyums.ac.ir.

***Corresponding author:** Esrafil Asgari

Abstract

According to Article 1 of the Waste Management Act adopted in 2004, in order to fulfill Article 50 of the Constitution of the Islamic Republic of Iran and to protect the environment of the country from harmful effects of waste and their optimal management, all ministries and organizations, public and non-governmental institutions and all legal persons and legal entities are required to comply with the laws and policies of the said law on waste management. The executive management of all waste in this law, except for industry and especially in cities and villages and their privacy, is the responsibility of the municipality and the countryside and outside their jurisdiction. Special and industrial waste is also responsible for their production. The waste management executive is authorized to receive the waste management costs from the producer and according to the instructions of the Ministry of the Interior according to the type of waste and spend only the waste management costs. This article examines some of the deficiencies in the law by implementing waste management law and calls for the correction of legal problems and the prevalence of environmental importance throughout the legal system of the country.

Keywords: Waste Management, Environment, Waste Management Law

Evaluation of Food Safety and Health Risk Factors in Foodservice Establishments; A Case Study in Qom province

Yadollah Ghafuri[1*], Zahra Atafar[2], Mahdi Mozafari[3,],

[1*] Research Center for Environmental Pollutants, Qom University of Medical Sciences, Qom, Iran
[2] Social Development & Health Promotion Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran
[3]Health Center of Qom University of Medical Sciences, Qom, Iran

*** Corresponding author.** Tel**:** +9832536602040 E-mail: yadollahghafuri@yahoo.com

Abstract

Background and Objectives : Existing data related to the status of food safety and health indicators of food services facilities in Qom province indicate that a low percentage of these centers have the necessary criteria in the principles of food safety. According to the factors affecting the promotion of food health and safety indicators, this study was conducted to identify and investigate the factors affecting the risk of food safety in food supply centers in Qom in 2018.

Methods: In this cross-sectional study, the required data were obtained through validated questionnaires about food safety and environmental health of food services facilities (n=380), effectiveness of variables such as training on food safety principles by designing before and after study, educational certification, ownership, urban health status and the age of operators, related with food safety factors have been assessed.

Results: The results showed that training of food safety principles in improving the current situation, have been a significant (49%, mean 5.44%, SD 3.20 ±, Pvalue <0.001) Also variables such as education level (Pvalue <0.05) and educational certification (Pvalue <0.001) have been effective in increasing food safety and health standards.

Conclusion: In order to improve the level of food safety, reviewing the process of educational programs, strengthening educational equipment and media and inter-sectoral coordination to strengthen the role of education should be planned.

Key word: Qom, Food Safety, Risk, Health

The Environmental Health Status of Women's Beauty Salons of Ivan, Ilam

Fatemeh Eslami [1*], Sajad mazloomi [2], Afsaneh Palangard [3], Mahsa Tahergorabi [4]

[1] Department of Environmental Health Engineering, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran, Tel.+989136397327; email: fatemeh.eslami6397327@gmail.com.
[2] Department of Environmental Health, School of public Health, Ilam University of Medical Science, Ilam, Iran. Tel. +98 9127789314; email: Sajad.mazloomi@yahoo.com.
[3] Department of Environmental Health Engineering, School of public Health, Ilam University of Medical Science, Ilam, Iran.
[4] Department of Environmental Health Engineering, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran, Tel.+989124359726; email: tahergorabi.m@gmail.com

***Corresponding author:** E-mail: fatemeh.eslami6397327@gmail.com, Tel.: +989136397327

Abstract

Introduction: Women's beauty salons are among the public places where attention to environmental health aspects is important in the person and society, because the lack of sanitation and non-performing, and so on are a threat to the health of the community. Therefore, the present study was conducted to determine the health status of women's hairdressing in city Ivan in 2017.

Materials and Methods: This descriptive cross-sectional study was carried out on all women's hairdressers in Ivan (70 Cases) in 2017. Information gathering was done by visiting women's hairdressing salons and completing the checklist form of the health regulations from the beauty salon and women's beauty salons and observation and interviewing. To analyze the data collected from the Excel software.

Results: The results showed that 14.67% and 57.68% of the decorators had a medical examination card And a public health education certificate respectively. From the point of view of the health of tools and equipment, 57.14%and in terms of the health condition of the building, a total of 42.4% of the barber shops had a favorable situation. Also, according to the results, more than half of the hairdressers do not handle the hands properly, and 60% of the hairdressers do not use the safety box to remove sharp objects from the body. Some women's craftsmen do privately render services such as tattoo, nail polish, and waxing, without any permission for a competent hairdresser and non-compliance with health regulations.

Conclusions: According to the results, the sanitary condition of women's hairdressers in the city of Ivan was not consistent with some of the indicators and the need for proper education, planning, intensification of examination for providing services such as tattoo, waxing and nail polish to control the health condition. Places and community health are essential.

Keywords: Women's Beauty Salon, Environmental Health, City of Ivan

Variation in the Concentration of Gaseous and Particulate Pollutants in Qom Province before and after the COVID-19 Outbreak

Reza Fouladi-Fard [1], Zahra Safari [1, 2,*], Mohammad Raza Hosseini [2], Razieh Vahidmoghadam [1], Mostafa Rezaali [3]

[1] Research Center for Environmental Pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran; rfouladi@muq.ac.ir (R.F); zsafari353@gmail.com (Z.S.); r1375vahid@gmail.com
[2] Student Research Committee, Qom University of Medical Sciences, Qom, Iran; m.reza68.h@gmail.com
[3] Independent researcher, Isfahan, Iran (formerly: Department of Civil and Environmental Engineering, Qom, Iran); mostafarezaali@gmail.com

***Correspondence:** zsafari353@gmail.com

Abstract

The aim of this study was to investigate the changes of gaseous and particulate air pollution in Qom province during the outbreak of coronavirus 2019 (COVID-19) (From 21 January to 20 May 2020) in comparison to same period of last year according to 5 scenarios (time classification). The data were obtained from air quality monitoring stations of Qom Environmental Protection Organization and then analyzed using Excel, SPSS, WRPLOTview, and ArcView (GIS). According to the results, in the first month of epidemic, all pollutants except PM_{10} were significantly different from the same period last year. On one hand; the average concentrations of NO2, SO_2 and CO decreased by 26.4, 39 and 0.2 $\mu g.m^{-3}$, respectively, compared to the same period last year. On the other hand, $PM_{2.5}$ and O_3 increased by 7.1 and 2.3 $\mu g.m^{-3}$, respectively. In the third scenario, an increase of 2.9 $\mu g.m^{-3}$ was observed in the average concentration of O_3 and decrease rates of 8.1, 23.8, 22.8, and 0.2 $\mu g.m^{-3}$ were experienced in the average concentrations of PM_{10}, NO_2, SO_2 and CO compared to the same period last year, respectively. The mean concentration of $PM_{2.5}$ was not significantly different from the same period last year. Also, the prevailing wind direction, in each scenario, was from the west of Qom city. The percentage difference between the average temperature in March, April and the total study time was 85.82%, 23.59% and 45.29%, respectively. The percentage difference between the mean wind speed in March, April and the total study time was -1.51%, 18.59%, and 22.40%, respectively. According to results, gaseous pollutants decreased during the restrictions, but particulate pollutants increased slightly compared to the same period last year, which may be due to natural factors such as increased wind speed from west of the country. Restrictions and closure of shops, restaurants, most factories, and industries, reduction of traffic jam had the greatest impact on reducing gas pollutants. The crisis has shown that serious policies and programs can help improve air quality in cities.

Keywords: Particulate pollutants, Gaseous pollutants, Air pollution, COVID-19

Site Selection of Municipal Solid Waste Landfill using Integration of AHP and TOPSIS Models: A Case Study in Naghadeh County

Seyed Javad Jafari [1], Abdollah Faramarzi [1], Hassan Khorsandi [1], Heydar Ahadi [1]

[1] Department of Environmental Health Engineering, School of Public Health, Urmia University of Medical Sciences, Urmia, Iran.

***Corresponding author:** H. Ahadi, E-mail: aliahadi5832@gmail.com, Tel: +98 44 32752300

Abstract

Introduction: Taking into account excessive growth of population in urban regions and increase of waste production per capita due to the industrialization of societies and improper comprehensive management plan of disposal of generated wastes, the sanitary landfill is still the most significant, most reasonable and least expensive method of waste disposal.

Material and methods: In the present research, AHP and TOPSIS models were used for weighting the layers and prioritization of the identified regions, respectively. Using the following criteria: (1) environmental criteria consisting of the sub-criteria groundwater depth, distance from rivers and streams, distance from wetland/ dam/ lake, (2) physical criteria consisting of the sub-criteria geology, slope percentage, distance from faults, heights, soil depth and aspects, (3) social-economic criteria with the sub-criteria Land uses, distance from urban centers, and distance from village, and finally, (4) access factors with the sub-criteria distance from roads, distance from power lines. Following preparation, the maps corresponding to each subscale were weighted in GIS environment by means of AHP process. To weight the layers and evaluate inconsistency rate of pairwise comparisons, Expert Choice software in which AHP model can be run was used.

Results and discussion: 11 highly suitable areas for landfill were identified on the output map resulting from the integration of layers and the identified options were ranked using the TOPSIS model and 5 new criteria based on experts' views. Ultimately, Area No. 12 was selected as the proposed site for a landfill in Naqadeh County.

Analysis of the result of landfill location in Naqadeh County is indicative of the fact that combination of multi-criteria decision-making models including AHP and TOPSIS can be properly utilized for the purpose of locating.

Keywords: AHP, TOPSIS, GIS, Landfill, Waste management

Quantitative and Qualitative characteristics of hospital waste in the city of Behshahr-2020

Morteza kohansal[1], Farzaneh Akhoundi [2], Maryam Hamzeh Berijani[3]

[1] Master of Occupational Health Engineering, Occupational Health Expert, Mazandaran University of Medical Sciences
[2] BS student in Environmental Health, Golestan University of Medical Sciences
[3] Expert in Environmental Health, Behshahr Health Network, Mazandaran University of Medical Sciences

Abstract

Introduction: Increasing the amount and variety of waste and environmental pollution and health hazards caused by it, has been raised as one of the important problems of human societies today. The range of this waste is so wide that it can be found in everything from ordinary household waste to the most dangerous chemical and biological pollutants. One of the important sources of waste production in any city is health centers, which also produce a wide range of waste. Therefore, the present study was conducted with the aim of quantitative and qualitative study of hospital waste in Behshahr.

Materials and Methods: In this cross-sectional study, 5 hospitals in Behshahr were examined. For this purpose, a questionnaire designed based on the format of the Ministry of Health was used, and also for quantitative analysis, the method of weighing with scales was used. The collected data were analyzed using excell and spss software.

Results: Based on the findings, the highest amount of total production waste, general waste, infectious waste, sharp and winning and chemical-pharmaceutical waste related to Imam Khomeini State Hospital and equal to the amounts of 453, 229, 209, 13 and 11 kg, respectively. Is the day. Per capita weight of total production wastes, infectious wastes, general wastes, sharp and winning wastes, and pharmaceutical chemicals equal to 2.44, 0.48, 1.38, 0.06 and 0.029 kg per day, respectively. Each bed was determined.

Conclusion: One of the most necessary measures to reduce health and environmental problems as well as the cost of hospital waste management is the proper implementation of the waste segregation program and monitoring their proper and hygienic disposal. With the obtained data, more efforts should be made in waste management and providing continuous training to staff and patient companions.

Keywords: Hospital Waste, per capita production, the volume of waste, infectious and non-infectious

Investigation of Relationship between Particulate Matter ($PM_{2.5}$) and Meteorological Parameters in Isfahan, Iran

Majid Kermani [1,2], Ahmad Jonidi Jafari [1,2], Mitra Gholami [1,2], Mahmood Yousefi [2], Kazhal Masroor [3], Ali Abdolahnejad [4], Masoumeh Tahmasebizadeh [5], Farzadfanaei [2,*]

[1] Research Center of Environmental Health Technology, Iran University of Medical Sciences, Tehran, Iran;
[2] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran; majidkermani@yahoo.com ahmad_jonidi@gmail.com gholamimitra32@gmail.com yousefi.eng70@gmail.com farzadfanaei37@gmail.com
[3] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; kazhal.masroor1993@gmail.com
[4] Department of Environmental Health Engineering, Maragheh University of Medical Sciences, Maragheh, Iran. abdolahnejad.a@gmail.com
[5] Department of Environmental Health Engineering, School of Public Health, Isfahan University of Medical Sciences, Isfahan, Iran mtahmasbi946@gmail.com

***Corresponding author:** Farzad Fanaei, Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran.
Tel.: +989016457815; Fax: +98 21 88622707
E-mail address: farzadfanaei37@gmail.com

Abstract

Introduction: Isfahan is one of the most important industrial cities in Iran that air pollution has been the biggest challenge of this city in recent years. So the present study aimed to investigate the effect of meteorological parameter on $PM_{2.5}$ concentration in ambient air of Isfahan metropolitan, in 2019-2020.

Material and methods: Sampling of $PM_{2.5}$ in 19 sampling points at Isfahan was carried out for 24 h during the four seasons. The concentration of particles collected on the filter was calculated by gravimetric method. Meteorological parameters in periods of study were recorded. Finally, relationship between $PM_{2.5}$ concentration and meteorological parameters was assessed by SPSS24 and EXCEL. The inverse distance weighting (IDW) interpolation technique by ArcGIS was applied to generate maps for annual averages.

Results: Seasonal variation trends of $PM_{2.5}$ particles showed that the maximum and minimum annual mean concentrations happened in winter and summer. Furtehrmore, the citizens of Isfahan are exposed to $PM_{2.5}$ pollutants 4-5 times more than the EPA-recommended standard. The findings of this study also show that there is a positive correlation between $PM_{2.5}$ particles and temperature, relative humidity and pressure. Moreover, a weak and negative correlation was found between ultraviolet radiation, precipitation, and wind speed with this particle.

Conclusions: The particle concentration scatter map shows that the central and north and northeast regions of Isfahan are more polluted than other areas. Therefore, to protect the health of citizens of Isfahan, appropriate policies and strategies should be adopted to reduce the concentration of particulate matter and other pollutants in the ambient air of this city.

Keywords: Air pollution; Isfahan city; Meteorological parameters; $PM_{2.5}$

Estimation of Water Quality on the bases of Drinking Water Quality Index and Risk Assessment of Nitrate Exposure, adopting Monte Carlo Simulation and Sensitivity Analysis, Groundwater Resources of Divandarreh County, Kurdistan province, Iran

Hamed Soleimani [1], Mahmood Yousefi [2], Vahide Oskoei [1,*]

[1] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (Email: Hasulimany@yahoo.com ; mohammad9783@gmail.com ; oskoei.v@gmail.com)
[2] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran (Email: Mahmood_yousefi70@yahoo.ccom)

***Corresponding author:** Vahide Oskoei Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran. Email: oskoei.v@gmail.com;

Abstract

Aim of the study: During farming practices in rural areas, various fertilizers are used, which can lead to the contamination of groundwater resources with nitrate and, consequently, can affect the health of consumers. This study aimed to investigate the groundwater resources' drinking suitability in rural areas of Divandarreh County, Kurdistan province, Iran using drinking water quality index (DWQI) and estimation of the non-carcinogenic health risk induced by nitrate due to the drinking route.

Methodology: Sixty groundwater samples collected (2018) from active dug-wells and twelve parameters (TDS, pH, TH, EC, HCO_3^-, K^+, Na^+, Mg^{2+}, Ca^{2+}, Cl^-, SO_4^{2-}, and NO_3^-) were measured to calculate DWQI. Also, non-carcinogenic risk assessment was carried out for four exposed groups using two approaches: deterministic and probabilistic by the Monte Carlo simulation.

Results: The results of WQI showed that 61.66, 31.66, and 6.66 % of samples fall within the class of excellent, good, and poor quality, respectively. The nitrate concentration in drinking water ranged from 36.06 ± 14.32 mg/L. The HQ mean for infants, children, teenagers, and adults were 0.90158, 1.17205, 0.90158, and 0.70436, respectively. Probability estimation showed the HQ values for the 5th, and 95th percentile in infants, children, teenagers, and adult groups were (0.52 - 2.53), (0.27 - 1.54), (0.25-1.40), and (0.15 - 0.71), respectively. Sensitivity analysis results showed that the most influential parameter in the non-carcinogenic risk in all exposed groups was NO_3^- concentration.

Conclusion: Generally, nitrate concentration was relatively high and required more attention, especially in agriculture and management of the use of fertilizers.

Keywords: Nitrate, Health Risk Assessment, Monte Carlo Simulation, Sensitivity Analysis, Drinking Water Quality Index (DWQI)

Investigation of the Fungal and Bacterial Contamination in Indoor Units and Outdoor Air of Kashan Beheshti Hospital in 2018

Mohsen Amirimoghaddam [1], Nezam Mirzaei [2*], Gholamreza Mostafaei [2], Davarkhah Rabbani [2], Sahar Gholipour [2], Ali Nazari-Alam [3], Fatemeh Atoof [4], Abbas Bahrami [5], Fereshteh Badie [6]

[1] Master of Environmental Health Engineering, Faculty of Health, Kashan University of Medical Sciences, Kashan, I.R. Iran.
[2] Social Determinants of Health (SDH) Research Center, Department of Environmental Health Engineering, Kashan University of Medical Sciences, Kashan, I.R. Iran.
[3] Department of Microbiology and Immunology, School of Medicine, Kashan University of Medical Sciences, Kashan, I.R. Iran.
[4] Department of Biostatistics and Epidemiology, Faculty of Health, Kashan University of Medical Sciences, Kashan, I.R. Iran.
[5] Department of Occupational Health Engineering, Faculty of Health, Kashan University of Medical Sciences, Kashan, I.R. Iran.
[6] PhD student in Bacteriology, Faculty of Medicine, Kashan University of Medical Sciences, Kashan, I.R. Iran.

***Corresponding author:** Nezam Mirzaei, nezammirzaei@yahoo.com

Abstract

Background: The health of patients with weakened immune systems is endangered by presenting of bacteria and fungi in the internal units of hospital as well as development of nosocomial infections in them. The current article aimed to investigation of the bacterial and fungal contamination degree in internal units and outdoor of the hospital in which some points are mainly considered such as the nosocomial infections and the discussion of improving the quality of hospital spaces and providing appropriate conditions to maintain the health of patients.

Materials and Methods: This study is a cross sectional study conducted in Kashan Beheshti hospital in 2018. Air sampling is done by direct bacterial sampler (Quick Take 30) along with identification of type and the number of fungi and bacterial colonies including 180 samples from internal units and outdoor spaces. Data analyzed statistically by SPSS 22, EXCELL, and BONFERRONI test.

Results: The obtained results from 180 samples showed that bacterial and fungal contamination among 180 was 97% and 47.8%, respectively. Moreover, most bacterial and fungal contamination existed in medical units and outdoors, respectively.

Conclusion: The results revealed that the micro-organisms concentration in internal units is more than in outdoors that results can be related with the presence of the patients, air conditioning, and inappropriate cleaning. For this reason, improving cleaning standards and setting the appropriate air-conditioning are suggested in internal units of the hospital.

Keywords: Bacterial contamination, Fungal contamination, Hospital units

4th International and
23rd National Conference
on Environmental Health
2 - 4 March 2021
Yazd-Iran

Environmental Pollution Control New Technologies

Presentations

Evaluating the Performance of Coupled MFC-MEC with Graphite felt/MWCNTs Nanocomposite Electrode in Landfill Leachate Treatment, Bioelectricity and Biogas Production

Hossein Jafari Mansoorian [1], Amirhossein Mahvi [2], Ramin Nabizadeh [3], Mahmood Alimohammadi[4], Shahrokh Nazmara[5], Kamyar Yaghmaeian[6]

[1] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; Email addresses: h.mansoorian@yahoo.com
[2] Center for Solid Waste Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran and Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; Email addresses:ahmahvi@yahoo.com
[3] Center for Solid Waste Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran and Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; Email addresses: rnabizadeh@tums.ac.ir
[4] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; Email addresses: m_alimohammadi@tums.ac.ir
[5] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran and Center for Water Quality Research (CWQR), Institute for Environmental Research (IER), Tehran University of Medical Sciences, Tehran, Iran; Email addresses: snazmara@razi.tums.ac.ir
[6] Center for Solid Waste Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran and Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; Email addresses: kyaghmaeian@yahoo.com

***Corresponding author:** Kamyar Yaghmaeian

Abstract

Purpose: A bioelectricity producing system was configured by connecting to a microbial electrolysis cell producing hydrogen, in which both systems were without mediator, to treatment the landfill leachate of the and generate bioelectricity and hydrogen.

Methods: The anode electrode was made with MWCNTs polyscale coating on graphite felt and the cathode electrode with activated carbon coating on carbon cloth. In the MFC-MEC coupled system, the electrodes were connected in series using copper wire. The system was set up in a fed-batch mode and the landfill synthetic leachate was injected into the anode MFC-MEC chamber as fuel.

Results: In MFC, the highest voltage, current density, and power density were 1114 mV, 44.2A/$m^{3,}$ and 49.24 W/m^3, respectively. The maximum of the coulombic efficiency system was 94.10%. The highest removed COD, NH_4-N and P was 97.38%, 79.56% and 74.61%, respectively. In the MEC, the maximum of voltage input, current density, and power density was 1106 mV, 43.88 A/$m^3$and 48.54 W/m^3, respectively. The maximum coulombic efficiency system was 125.54%. Also the highest removed COD, NH_4-N and P was 97.46%, 78.81% and 76.25%, respectively. The highest biogas production rate and its yield were 39 mL/L.d, and 0.0118 L/g COD_{rem}, respectively.

Conclusion: This study found that the MFC-MEC coupled system had promising potential for strong wastewaters treatment, such as the leachate of landfill; and the in-site use of generated electricity and the production of useful fuels such as biogas.

Keywords: Microbial fuel cell, Microbial electrolysis cell, Bioelectricity generation, Biogas production, Polyscale electrode, Leachate treatment

Performance of Photoreactor on the Biofiltration of N-Hexane Vapours from the Polluted Air Stream

Negar Jafari [1], Mehdi Mokhtari [2], Yaghoub Hajizadeh[1], Amir Mohammadi [3], Ali Behnami[3], Farzad Fanaei [4], Mojtaba Pourakbar[3], Sepideh Nemati [5], Ali Abdolahnejad [3]*

[1] Department of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran. Email address: N64jafari@gmail.com, y_hajizadeh@hlth.mui.ac.ir
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Faculty of Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Email address: mokhtari@ssu.ac.ir
[3] Department of Environmental Health Engineering, Maragheh University of Medical Sciences, Maragheh, Iran. Email address: amahammadi@gmail.com, ali.behnami64@gmail.com, Ppourakbar@yahoo.com, abdolahnejad.a@gmail.com
[4] Department of Environmental Health Engineering, Iran University of Medical Sciences, Tehran, Iran. Email address: farzadfanaei37@gmail.com
[5] Department of Environmental Health Engineering, Tabriz University of Medical Sciences, Tabriz, Iran. Email address:nemati.sepid@gmail.com

***Corresponding author:** Ali Abdolahnejad, Email address: abdolahnejad.a@gmail.com

Abstract

Biofiltration of hydrophobic and/or recalcitrant volatile organic compounds such as n-hexane is imperfect. N-Hexane, is one of the most hydrophobic VOCs widely used as cleaning agent and as a solvent in various industries such as oil and grease removal, oil extraction of vegetables, petroleum processing and plastics industries that is not completely biodegradable by a single biofilter. So, a photoreactor system as a pretreatment was used for increasing the removal efficiency of n-hexane by a biofilter during an operation period of three months. The inlet and outlet concentration of n-hexane was analyzed with gas a chromatograph coupled with a flame ionization detector (GC/FID). The removal efficiency of the single biofilter in the Optimum Empty Bed Residence Times (EBRTs) was 45%. When the photoreactor was used as a pretreatment system, the removal efficiency of the hybrid system was improved to 92%. Thus, the application of the photoreactor as a pretreatment step was much effective in increasing the removal efficiency of n-hexane from the polluted air stream by the biofilter.

Keywords: N-hexane, Photoreactor, Biofilter, Hybrid system

Photocatalytic Degradation of Microcystin-LR by TiO_2/Zeolite Nanocomposite from Aqueous Solutions

Negar Jafari [1], Afshin Ebrahimi [1], Farzad Fanaei [2], Amir Mohammadi [3], Ali Behnami [3], Sepideh Nemati [4], Mojtaba Pourakbar[3], Ali Abdolahnejad [3]*

[1] Department of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran. Email address: N64jafari@gmail.com, aebrah189@gmail.com
[2] epartment of Environmental Health Engineering, Iran University of Medical Sciences, Tehran, Iran. Email address: farzadfanaei37@gmail.com
[3] Department of Environmental Health Engineering, Maragheh University of Medical Sciences, Maragheh, Iran. Email address: amahammadi@gmail.com, ali.behnami64@gmail.com, Ppourakbar@yahoo.com, abdolahnejad.a@gmail.com
[4] Department of Environmental Health Engineering, Tabriz University of Medical Sciences, Tabriz, Iran. Email address: nemati.sepid@gmail.com

***Corresponding author:** Ali Abdolahnejad, Email address: abdolahnejad.a@gmail.com

Abstract

Microcystin (MCs) is a hepatotoxic and carcinogenic toxin that generation by cyanotoxins which can be adverse effects on human health. Therefore, it is very important to remove it from the environment. This study was aimed to survey the efficiency of TiO_2/ Zeolite nanocomposite for the removal of MC-LR under UV light. TiO_2/Zeolite nanocomposite was synthesized using the hydrothermal method. Characteristics of the catalysts were determined by FESEM, XRD, and FT-IR spectra. The Response Surface Methodology (RSM) was used to survey the effects of operating variables such as pH, contact time, and catalyst dose on the removal of MC-LR. The MC-LR concentration was measured by high-performance liquid chromatography (HPLC).The results showed that the increase of contact time and catalyst dose had a positive effect on enhancing the removal efficiency of MC-LR, but the effect of pH was negative. Finally, the maximum removal efficiency of MC-LR was 93%, which occurred at pH= 5, contact time= 120 minutes, and catalyst dose= 1 g/l. In general, T/N-Z composite in aqueous solutions under the UV light can easily degrade MC-LR and it can be also proposed as an effective composite for the photocatalytic degradation of MC-LR.

Keywords: Microcystin-LR, TiO_2/Zeolite, Photocatalytic degradation, UV light

Prediction of Greenhouse Gas Emissions and Potential Energy Recovery from Yazd Landfill Site, Iran

Mehdi Mokhtari [1], Aliasghar Ebrahimi [2], Salimeh Rezaeinia [3*]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; mhimokhtari@gmail.com
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; ebrahimi20007@gmail.com

***Corresponding author:** Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences; srezaiinia1369@gmail.com

Abstract

Introduction: Increased greenhouse gas emissions have changed the global air temperature and have adversely affected global climatic conditions. Landfill is one of the most important factors in the production of greenhouse gases. The purpose of this study is to estimate the emitted greenhouse gases and energy recovery potential from landfills in Yazd County.

Methods: In this descriptive cross-sectional study, LandGEM and IPCC models were used to determine the amount of greenhouse gases in the landfill of Yazd city during the years 2000-2020. Default values of the model such as methane production capacity (L_0) and methane production rate (K) were calculated based on the climate and waste composition of the area for a more accurate estimate. In addition, the potential electricity generation was estimated from waste landfills in Yazd County.

Result: The total emission of methane by the Yazd Landfill site was calculated from 2000 to 2020 and estimated as follows: 23.17 Gg/y according to the IPCC model and 5.74 Gg/y by LandGEM model. The total amount of carbon dioxide was estimated to be 17.75 Gg/y using the LandGEM model. Electricity generation potential was obtained 11.88 MWh/year for Yazd Landfill site in 2020.

Conclusion: The results of the present study can be used to plan a methane gas collection system as an energy source and control the emission of greenhouse gases to the landfill.

Keywords: Greenhouse gases, Municipal solid waste, LandGEM, IPCC, Yazd

Evaluation of the Efficiency of Anaerobic Hybrid Bioreactor (IAnUSB/RBBR) in Removing Total Petroleum Hydrocarbons from the Sludge of Crude Oil Storage Tanks

Mahdi Farzadkia[1, 2], Majid Kermani [1, 2], Ali Esarfili[1, 2], Mahdi Ghorbanian[3], Niloufar Borhani Yazdi[4], Hasan Pasalari[1, 2], Ehsan Abouee Mehrizi[4]

[1] Research Center for Environmental Health Technology, Iran university of Medical Sciences, Tehran, Iran
[2] Department of Environmental Health engineering, School of Public Health, Iran university of Medical Sciences, Tehran, Iran
[3] Department of Environmental Health engineering, School of Public Health, North Khorasan University of Medical Sciences, bojnurd, Iran
[4] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

***Corresponding author:** Email: ehsan.abouee@gmail.com, Tel number: 09120203237

Abstract

Introduction: One of the most complex and costly issues in waste management is the treatment and decontamination of hazardous oily wastes from various processes in oil refineries. The presence of non-biodegradable compounds, the high cost of utilizing chemical methods, and the impossibility of industrialization in the use of these processes have led to the expansion of the use of treatment methods based on biological modification. Therefore, the aim of the present study was to determine the efficiency of anaerobic bioreactor in the removal of hydrocarbon compounds in oily sludge.

Material and method: The recent study is based on an experimental scale. Besides, real samples of oily sludge after passing through the homogenizer reactor were continuously injected into a hybrid bioreactor containing suspended and adhesive microorganisms to remove oily hydrocarbons as the predominant waste contaminant. In order to express the performance of the bioreactor, three parameters were applied including: specific rate of hydrocarbon consumption, biodegradation rate and removal efficiency. TLC-FID method was also used to determine the concentration of petroleum hydrocarbons by standard gravimetric method as well as determining the amount of SARA compounds.

Results: The results represented the removal rate by anaerobic bioreactor at a maximum concentration of 48.7%. In all stages of adoption and operation, the specific rate of hydrocarbon consumption and the rate of biodegradation had an increasing trend over time, which indicated the proper performance of the bioreactor.

Conclusion: The study revealed that the use of a hybrid biological process owing to increasing the overall resistance of the reactor to shock due to sudden changes in concentration because of the presence of biofilm significantly improves the efficiency of the system in removing TPH. Moreover, implementing bioremediation method alone is not an option for complete management of oily sludge contaminants. In addition, due to the presence of hard biodegradable compounds such as asphaltenes and resins, a combination of chemical and biological processes is recommended.

Key words: Oily sludge, Total oily hydrocarbons, Gravimetriy, SARA.

Environmental Pollution Control New Technologies

Posters

Evaluation Conformity of Different Leachate Management Scenarios from Municipal Waste Landfill from a Technical and Economic Perspective; A Case study of Sanandaj

Jamshid Majidi [1], Abdollah Ghavami [2], Sirvan Ghafouri [3], Mahdieh Tondro [4]

[1] HSE expert of Sanandaj Municipality Waste Management Organization (Author); majidy.1989@ymail.com
[2] Abdullah Ghavami, Environmental Health Engineering Expert and Technical and Executive Deputy of Sanandaj Municipality Waste Management Organization;ghavami1354@yahoo.com
[3] Sirvan Ghafouri Master of Urban Planning and Head of Waste Management Organization of Sanandaj Municipality; sirvan ghafouri@gmil.com.
[4] BS student in Microbiology, Islamic Azad University of Sanandaj

***Corresponding author:**

Abstract

Leachate production and management is known as one of the environmental problems related to the operation of landfills and by infiltrating surface and groundwater causes pollution of water and soil resources. One of the most important contaminants in landfills is waste leachate. The wastes of Sanandaj city and surrounding villages will be transferred daily to the current landfill of Sanandaj city since 1993 and therefore will cause leachate production. BOD and COD leachate is very high and contains a variety of heavy metals, organic matter, minerals, and microorganisms that enter the river downstream and pollute running water. Therefore, the management and disposal of leachate from local waste should be considered as a very important and necessary issue by city managers.

Lack of leachate collection pipes in Sanandaj landfill was evaluated as the main factor in limiting the Fukaoka method.

Based on the location of Sanandaj landfill, topography of the region, climatic conditions, the amount of leachate produced during rainfall, justification of economic costs and technical and expert studies, as well as considering the short distance between municipal wastewater treatment plant and the current landfill. Leachate transfer to Sanandaj wastewater treatment plant by gravity method and by polyethylene pipeline from the side of Sanandaj-Kamyaran road has been selected as the most suitable option for landfill leachate management. In this research, it is tried to provide solutions for the implementation of the leachate transfer method to the municipal wastewater treatment plant for the purpose of combined treatment with domestic wastewater in accordance with the above conditions.

Keywords: Leachate, Pollution, Landfill, Municipal Wastewater Treatment Plant, Leachate Transfer

Evaluation of the Effect of Ph and Potassium Ferrate Dose on Humic Acid Removal fromAqueous Solutions

Zeynab Feyzi1 [1]*

[1] Environmental Research Center, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran :Email Feyziz837@gmail.com

Abstract

Background: Humic acid compounds cause numerous problems in the water industry and soil bioremediation. These compounds have created an unpleasant taste and color in water. The aim of this study was to Evaluation of the effect of pH and potassium Ferrate dose on humic acid removal fromAqueous solutions.

Methods: This study was a cLnicaL triaL that was conducted on a Laboratory scaLe Potassium Fraat soLd as an oxidizer to remove humic acid were made in vitro. The effect of various parameters pH, initiaL concentration of humic acid, potassium Euphrates dose and contact time on the removaL of humic acid was studied

Results: . Optimum conditions humic acid, humic acid concentration, the dose of potassium Fraat, pH and contact time to 12mg/L, 8 respectiveLy.

ConcLusion: According to the resuLts of the Euphrates as anoxidizer potassium as weLL as signed properties consumers may be effective in removing humic acid from aqueous soLutions

Key words: Humic acid, Potassium Fraat, Oxidation, Natural organic matter

Removal of Safranine Dye from Aqueous Solution using a Zinc Oxide Fixed on Zeolite in the Presence of Ultraviolet Radiation

Davar Hasanzadeh [1*] , Dariush Naghipour [1]

[1] Department of Environmental Health Engineering, School of Health, Guilan University of Medical Sciences, Rasht, Iran.

***Corresponding author:** Tel: +984532827260, Fax: +984532822303, E-mail: a.hasani80 @yahoo.com

Abstract

Colors are one of the most important groups of environmental pollutants that endanger human health and the environment if they enter the environment without treatment. Due to the high solubility and stability of dyes in water, increasing attention has been paid to industrial wastewater degradation and treatment.In this study, the efficiency of ZnO nanoparticles fixed on natural zeolite as a photocatalyst for the degradation of safranine dye by UV light was investigated. In order to determine the optimum conditions, the effect of color concentration and pH of the solution were studied.FESEM images show that the zinc oxide particles are well on the zeolite surface and XRF analysis confirmed the presence of Fe-ZSM5 zeolite and ZnO anatase phase in the synthesized photocatalyst. The optimum pH and dye concentration for dye removal by synthetic ZnO-Zeo / UV photocatalyst were 9 and 100 mg / l, respectively. The highest removal of 100% safranine dye under optimum UV irradiation was 105 min. Synthetic photocatalyst can be reused up to 4 times. The results showed that UV/ZnO-Zeolite was an effective method in removal of safranin dye from aqueous solutions.

Key words: ZnO nanoparticles, Zeolite, Safranin dye, Photocatalytic reduction

Application of Modified MOF in Pesticide Removal from Aqueous Solutions

Abooalfazl Azhdarpoor [1], Zohre Moeini [2]

[1] School of Health, Shiraz University of Medical Sciences, Shiraz, Iran; azhdarpoor@sums.ac.ir
[2] Department of Environmental Health Engineering, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran; moeini.zohre@yahoo.com

***Corresponding author:** Zohre Moeini

Abstract

SalicylaldehydeeNH2MIL-101(Cr) (S-MIL) can easily remove organic pollutants from water owing to features, such as high surface area, large, variable, and adjustable pores, good performance of cavity, compounds, and structure, and free metal site. The present study aimed to investigate the removal of atrazine using S-MILwith initial concentration of atrazine (30 mg/l), pH (3 and 7), and time (5-60 min).

The MIL-101 adsorbent was synthesized and then MIL-101 refluxed with Salicylaldehyde.

After confirmation of photocatalyst synthesis using SEM atrazine removal was investigated using MIL-101 and S-MIL.

The results showed that at the initial concentration of 30 mg/l, during 60 min, removal atrazine concentration using 2 g/l of MIL-101 and 1.66 g/l of S-MIL was 37% and 69%, respectively.

Hence, it can be concluded that adding Salicylaldehyde to MIL-101 structure, improved the removal and adsobtion efficiency of MIL-101. Thus S-MIL can be used with other atrazine treatment methods.

Keywords: MIL-101, MOF, Salicylaldehyde, Atrazine

Investigation of the Effect of Constant Magnetic Fields on the Volume of Effluent in Complete Mixing Activated Sludge Process

Ghorban Asgari[1], Ramin Khoshniyat[2], Hana Shebrandi[3]

[1]Professor, Social Determinants of Health Research Center (SDHRC), Faculty of Public Health, Department of Environmental Health Engineering, Hamadan University of Medical Sciences, Hamadan, Iran; g.asgari2003@gmail.com
[2]Ph.D. Student, Department of Environmental Health Engineering, School of Health, Hamadan University of Medical Sciences, Hamadan, Iran.
[3]MS, Supervisor of Sanandaj wastewater treatment laboratory, Kurdistan Water and Wastewater Engineering Company, Sanandaj, Iran; hana.shabrandy83@gmail.com

***Corresponding Author**: ramin_kh1975@yahoo.com

Abstract

In wastewater treatment processes, more attention is paid to the qualitative aspects of the process and less attention is paid to quantitative aspects such as the volume of treated effluent. On the other hand, In the wastewater treatment process, chemical and biological methods are generally used to separate the solid phase from the liquid, and in addition to using gravity as a physical process, other physical processes, including the use of magnetic fields (MFs) and their effect on biological processes have received less attention. In this study, the effect of MFs on the volume of effluent produced by the complete mixed activated sludge process is mentioned. The intensity of the production field in 17 ranges from 0.19 to 3.25 mT and the duration of its use on the mixed aeration fluid of the aerated basin of the completely mixed sludge process was selected. Data were analyzed using SPSS21 and One Sample t Test. In this study, SVI index and residence time of 30 minutes was used to estimate the volume of sediment, but in fact, the volume of effluent isolated from sediment in the case samples was compared with the control samples. According to the results of this study, the MFs can increase the volume of effluent produced in the case samples compared to the control samples by 20 to 400 ml. This relationship is not linear, but with increasing intensity of MFs, the effluent increase 42% in a volumetric scale.

Keywords: Magnetic fields, Effluent quantity, Complete mix activated sludge

Paper and Cardboard Wastewater Treatment using Electrocoagulation Process

Maryam Dolatabadi [1*], Saeid Ahmadzadeh [2,3*]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Pharmaceutics Research Center, Institute of Neuropharmacology, Kerman University of Medical Sciences, Kerman, Iran.
[3] Pharmaceutical Sciences and Cosmetic Products Research Center, Kerman University of Medical Sciences, Kerman, Iran.

***Corresponding author:** Health.dolatabadi@gmail.com and chem_Ahmadzadeh@yahoo.com

Abstract

Chemically enhanced wastewater treatment is attracting substantial interest, especially for wastewaters that are not amenable to treatment by conventional biological treatment strategies. The pulp and paper industry has been considered as one of the biggest consumers of natural resources (wood, water), energy (electricity and fossil fuels) and as major contributor of pollutants discharge to the environment. High consumption of water is one of the most important environmental concerns in paper industry. In general, the paper industry consumes great quantities of natural resources, especially water and energy. Thus, it has significant impacts on the environment. It generates large volumes of wastewater that adversely affects fresh water resources. Therefore, this study aimed to determine the efficiency of electrocoagulation process for removing COD from paper and cardboard wastewater. In the current work, experimental studies were done by a plexiglas reactor in laboratory scale using Fe electrodes. The amount of pH 8.5, reaction time 15 min, current density 5 mA.cm-2 and 400 mg electrolyte type NaCl were optimized for successful removal. The obtained results revealed that in optimized condition, the removal efficiency of COD was 78.28% and the consumed energy was 1.48 kWh.m-3.

Keywords: Paper and Cardboard Wastewater, Treatment, Electrocoagulation Process.

Investigation of Photo Electro-Fenton Process in Phenol Removal from Industrial Wastewater

Maryam Dolatabadi [1*], Saeid Ahmadzadeh [2,3*]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Pharmaceutics Research Center, Institute of Neuropharmacology, Kerman University of Medical Sciences, Kerman, Iran.
[3] Pharmaceutical Sciences and Cosmetic Products Research Center, Kerman University of Medical Sciences, Kerman, Iran.

***Corresponding author:** Health.dolatabadi@gmail.com and chem_Ahmadzadeh@yahoo.com

Abstract

With the rapid development of the economy and industry, the increase of various industries has inevitably caused various kinds of environmental problems. Phenol and its derivatives, as important organic intermediates, are widely used in various products such as pesticides, rubbers, paints, and dyes. As a result, more and more effluents containing phenol and its derivatives are discharged into water. This could destroy the environment and endanger the organisms owing to their toxicity. Therefore, the current study aimed to evaluate the efficiency of photoElectro-Fenton (PEF) process for removing phenol from industrial wastewater. Experimental studies were carried out using Plexiglas reactor in laboratory scale by iron electrodes. The effect of various variables including; pH solution (2-12), current density (5-20 mA cm^{-2}), initial phenol concentration (10-100 mg L^{-1}), and reaction time (3-15 min), and intensity using 1 to 3 lamps UV, were investigated to achieve the best efficient and economical phenol contamination removal condition. The maximum removal rate was achieved at the current density of 10 $mA.cm^{-2}$, initial phenol concentration of 25 mg L^{-1}, intensity using 3 lamps, and pH 4 within the reaction time of 10 min. The kinetic investigation best fitted with pseudo-first-order model. The obtained results revealed that in optimized condition, the removal efficiency of phenol was 98.4% and the consumed energy was 0.307 $kWh.m^{-3}$.

Keywords: Phenol; Removal efficiency; Industrial wastewater; Photo-electro-Fenton

Investigation of Residual Concentration of Organochlorine, Organophosphorous, and Carbamate Pesticides in Urban Drinking Water Networks of Hamadan Province in 2019

Seyyed Bahman Aleseyyed [*1], Lida Rafati [2], Mahdi Khodabakhshi [3]

[1] Water and Wastewater Reference Laboratory, Hamadan University of Medical Sciences; aleseyyed@gmail.com
[2] Department of Environment Health Engineering, Hamadan University of Medical Sciences; l.rafati@yahoo.com
[3] Department of Environment Health Engineering, Hamadan University of Medical Sciences; m.khoda1976@gmail.com

*** Corresponding author:** aleseyyed@gmail.com, Tel: +989127518514, +988138278690

Abstract

Background & Objective: Pollution of water resources with pesticides is one of the environmental problems and a serious threat to the communities health. Since the quality of drinking water is important at the point of consumption, this study was carried out to determine the residual concentration of pesticides in urban drinking water networks of Hamadan province in 2019.

Material and Methods: This study was a descriptive cross-sectional study. In order to investigate the residual concentration of organochlorine (aldrin, dieldrin, lindane, methoxychlor and permethrin), organophosphorous (chlorpyrifos, diazinon and malathion) and carbamate (atrazine and alachlor) pesticides in drinking water networks of the province, a total of 46 samples from urban water distribution networks was taken based on standard methods in July 2019. After transferring the samples to the laboratory and performing the sample extraction and preparation, the extracts were analyzed by GC-ECD in according to the existing guidelines and standards and the results were analyzed using Excel software.

Results: According to the results, the residues of aldrin, dieldrin, lindane, diazinon, malathion, atrazine and alachlor were found in none of the samples. The maximum concentrations of chlorpyrifos and permethrin were 2.20 and 8.03 µg.L^{-1} respectively. The methoxychlor residue was observed only in one sample with concentration of 0.35 µg.L^{-1} and the all other samples were free of methoxychlor.

Conclusion: The results showed that the residues of studied pesticides in all samples are much less than the maximum allowed in the national standard and the WHO and EPA guidelines. Therefore, it can be concluded that the status of networks and as a result of urban drinking water resources in Hamadan province is at a very good level in terms of the quality of pesticide residues. In addition, if the consumption of pesticides is not controlled, there is a possibility of increasing the concentration of these pollutants in water resources and threatening the health of the population of the province in the future.

Keywords: Pesticide, Drinking water, Hamadan province, Gas chromatography

A Review of the Efficiency of Electrochemical Process based on Persulfate Radicals in Removing Antibiotics from Aqueous Medium

Seyedeh Mahtab Pormazar[1,2], Arash Dalvand[1], Mohammad Taghi Ghaneian[1], Arezo Rezaie [1, 2*]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School
of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Student Research Committee, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

***Corresponding author:** Arezo Rezaie; Email address: arezorezaie373@gmail.com

Abstract

In recent years, the widespread use of antibiotics has caused contamination of surface and underground water resources. Antibiotics are not removed by conventional water and wastewater treatment methods, and the development of new methods to remove them is indispensable. Recently, the electrochemical process has been used for persulfate activation because of its benefits in producing less sludge, reducing both reactor volume and investment costs. This study reviews recent articles on the removal of antibiotics from aqueous media by combining the persulfate anion with the electrochemical process. Also, information about the factors affecting the efficiency of this process such as pH, current density, persulfate concentration, and initial concentration of antibiotics provided. According to the results, the electro-persulfate process is strongly dependent on pH. Increasing the concentration of persulfate and the current density, decreasing the pH and the initial concentration of the antibiotic led to improving the process and increasing the removal efficiency of the antibiotic. The results of the studies showed that the combination of persulfate anion with the electrochemical process for producing iron and activation of the persulfate is a suitable method in removing antibiotics from aqueous media and it can be used as a suitable alternative for the treatment of resistant pollutants.

Keywords: Antibiotic, Persulfate anion process, Electrochemical process, Electro-persulfate

Effective Degradation of Mefnamic Acid by Proxymosulfate activated with MWCNTs-$CoFe_2O_4$

Nezamaddin Mengelizadeh [1], Ali Parvizimehr [1], Zohreh Berizi [1]

[1] Research Center of Health, Safety and Environment, Department of Environmental Health Engineering, Faculty of Evaz Health, Larestan University of Medical Sciences, Larestan, Iran.

***Corresponding author:** Email: nezam_m2008@yahoo.com; Phone number: +98-939-231-2472)

Abstract

The cobalt ferrite nanoparticles ($CoFe_2O_4$) were loaded onto multi-walled carbon nanotubes (MWCNTs) and used as peroxymonosulfate (PMS) activator for mefenamic acid (MFA) degradation. The results of comparative experiments showed that the high performance of MWCNTs-$CoFe_2O_4$ system in MFA removal (97.63%) compared to other homogeneous and heterogeneous processes. Appropriate decomposition of MFA occurred over a wide pH range and maximum system efficiency was improved by increasing catalyst dosage and PMS. The presence of different anions led to a reduction in the removal efficiency of the target contaminant through the production of reactive species with low oxidation potential. Trapping experiments confirmed $SO_4^{\bullet-}$ as the main reactive species for the decomposition of MFA and its oxidation to by-products. The stability and recyclability of MWCNTs-$CoFe_2O_3$ were evaluated in the sequential reaction cycle, where the MFA decomposition rate reached to 89.75% after 4 reactions. MFA decomposition products and their degradation pathway were proposed based on GC-MS analysis.

Keywords: Mefenamic acid, MWCNTs-$CoFe_2O_4$, Peroxymonosulfate, Degradation pathways

Photocatalytic Removal of Tamoxifen from Aqueous Solutions using Magnetic Activated Carbon Coated with Zinc Oxide

Negin Nasseh [1], Ayat Hossein Panahi [2], Arezo Rezaie [3,4*]

[1] Social Determinants of Health Research Center, Environmental Health Engineering Department, Faculty of Health, Birjand University of Medical Sciences, Birjand, Iran.; Email address : Negin.nasseh2020@gmail.com
[2] Student Research Committee, Department of Environmental Health Engineering, Hamadan University of Medical Sciences, Hamadan, Iran.; Email address: ayatpanahi@yahoo.com
[3] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School
of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[4] Student Research Committee, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

***Corresponding author:** Arezo Rezaie; Email address: arezorezaie373@gmail.com

Abstract

In recent years, used medicinal compounds for therapeutic purposes in humans and in veterinary medicine and animal husbandry have been classified by researchers as emerging contaminants. Among the pharmaceutical compounds, tamoxifen as a non-steroidal tri-phenylethylene is one of the most widely used anti-cancer drugs against cancer, which is widely used in various stages of treatment, inhibition, and prevention of breast cancer. In general, the mechanism of the photocatalytic method uses a semiconductor material as a catalyst (e.g., ZnO and TiO2 nanoparticles) in the presence of a source of sunlight, simulated sunlight, and UV to produce free radicals. The aim of this paper was investigation the diagnostic catalytic properties and efficiency of a newly synthesized photocatalyst, MAC @ ZnO magnetic nanocomposite, for the degradation of tamoxifen in the photocatalytic process. Photocatalytic reactions were performed by simulating sunlight using a special device under various factors such as pH, catalyst dose and initial concentration. Degradation efficiency of tamoxifen under pH 7, catalyst dose 0.005 g/l, initial concentration 10 mg/l reached to level high and complete degradation was achieved. Finally, the results showed that the synthesized particles have potential value and can be used in a full scale as a photocatalyst to remove the wastewater containing tamoxifen.

Keywords: MAC@ZnO magnetic nano-composite; Photocatalytic reactions; Degradation; Tamoxifen

Using a Deep Convolutional Neural Network and Extreme Learning Machines to Predict Tropospheric Ozone Concentrations; A Case study of Tehran

Reza Fouladi-Fard [1], Nayereh Rezaie Rahimi [1,2], Mostafa Rezaali [3]

[1]. Research Center for Environmental Pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran. Email address:S.rezaie51@gmail.com
[2]. Student Research Committee, Qom University of Medical Sciences, Qom, Iran.
[3] Independent researcher, Isfahan, Iran (formerly: Department of Civil and Environmental Engineering, Qom University of Technology, Qom, Iran)

***Corresponding author:** Nayereh Rezaie Rahimi

Abstract

Background and Purpose: Air pollution is one of the most critical problems of human society in developing countries. Tropospheric ozone is one of the pollutants with severe health effects on humans. This study aimed to predict tropospheric ozone concentration by models based on deep learning and extreme learning machines.

Material and method: In this study, data received from the Meteorological Organization and Tehran Air Quality Control Company after pre-processing to predict tropospheric ozone concentration were entered into models based on deep learning and extreme learning machines. In this regard, various meteorological variables and ozone concentration with 24 hours' delay during modeling and coding in Matlab a2020 environment were used as predictors of ozone concentration for the next 24 hours. Then, the models used were evaluated using different error metrics.

Findings: The variable selection algorithm's output for non-wavelet models, the observation time variables, DW, and temperature were selected as three important variables describing the surface ozone concentration in non-wavelet models. Predicting wavelet coupled models with various artificial neural network models; Deep and extreme learning had 7.81 less error than non-wavelet models with mean RMSE, 8.56 less than non-wavelet models with mean RMSE. The results obtained from other error functions such as R had acceptable results. For both wavelet and non-wavelet models and the evaluation of the health effects attributed to ozone.

Conclusion: This study improved the prediction performance of tropospheric ozone concentration compared to previous studies. A variable selection algorithm reduced processing costs and eliminated unnecessary data from input data to models.

Keyword: Tropospheric ozone; Deep learning machines; Extreme learning machines; Air pollution; Forecasting

The Evaluation of Adsorption Efficiency of Pentachlorophenol by Magnetized Chitosan from Aqueous Media: Optimization by Response Surface Methodology

Mehdi Salari [1], Maryam Moradnia [2], Mohammad Noorisepehr [3,4], Mohammad Darvishmotevalli [3*]

[1] Department of Environmental Health Engineering, School of Health, Hamadan University of Medical Sciences, Hamadan, Iran,msalari@yahoo.com
[2] Student Research committee, Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran, Moradnia.mui@gmail.com
[3] Research Center for Health, Safety and Environment (RCHSE), Alborz University of Medical Sciences, Karaj, Iran, mohamad.darvish68@gmail.com
[4] Department of Environmental Health Engineering, School of Public Health, Alborz University of Medical Sciences, Karaj, Iran, dr.noorisepehr@gmail.com

***Corresponding author:** Mohammad Darvishmotevalli, mohamad.darvish68@gmail.com

Abstract

Aim of study: The presence of pentachlorophenol (PCP) in aqueous media has caused environmental and human health concerns due to its toxicity and mutagenicity. In this study, magnetic chitosan was used as an adsorbent in PCP removal from aqueous media and this process was optimized by central composite design-response surface methodology (CCD-RSM) method.

Methodology: Adsorption experiments were performed on a continuous system in Erlenmeyer. The volume of PCP solution in each test was 200 ml. Effect of input variables including pH (3-11), contact time (10-50 minutes), adsorbent dose (0.2-1 g/l) and concentration of PCP (15-75 mg / l) on adsorption efficiency was studied systematically study by CCD-RSM method. FTIR, XRD and VSM analyzes were used to investigate the adsorbent properties.

Results: FTIR, XRD and VSM analyzes showed that the magnetized chitosan was well synthesized. Also, adsorption tests showed that the highest adsorption efficiency is obtained at pH = 6.5, contact time = 50 minutes, adsorbent dose = 1 g/L and PCP concentration = 15 mg/l. The model obtained by CCD-RSM method had good predictability and R^2 = 0.9996 was obtained for this model.

Conclusion: This study shows that the RSM-CCD method has a high capability in determining correlation and modeling of the effect of input parameters on the adsorption efficiency. The magnetized chitosan can also be used as an inexpensive and available adsorbent for use in adsorption processes.

Keywords: Pentachlorophenol, Magnetized chitosan, Response surface method, Aqueous media

Application of Catalytic Nanopolymers for the Removal of BPA from Aqueous Solutions

Zeynab Feyzi1 [1]*، Raziye zadali [2]

[1] Environmental Research Center, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran Email:Feyziz837@gmail.com
[2] Research Committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran, Email: zadeali.r@gmail.com.

Abstract

This study report a new strategy for stabilizing palladized iron (Fe-Pd) nanoparticles with sodium carboxymethyl cellulose (CMC) as a stabilizer for the removal of BPA from aqueous solutions. Transmission electron microscopy (TEM) analyses indicated that the CMC-stabilized nanoparticle with a diameter 20 nm is highly dispersed in water. At an optimum dose of 0.17 g/L, the Fe-Pd bimetallic nanoparticle was able to remove 94% of BPA (C_0= 0.75 mg/L) in 70 min., suggesting that the presence of Pd could significantly enhance the reduction of BPA. It was found that the optimum pH, contact time, and BPA concentration for efficient removal of BPA was 7, 70 min, and 0.75 mg/L, respectively. It was concluded that the Fe-Pd bimetallic nanoparticle is an efficient adsorbent for the BPA removal from aqueous solutions.

Keywords: Bisphenol A (BPA), Catalytic reduction, Carboxymethylcellulose sodium (CMC), EDCs, Nanopolymer, Stabilizer

Degradation of Insecticides from Aqueous Solutions by Photocatalytic Processes: A Systematic Review and Meta-Analysis

Mojtaba Yeganeh[1,2], Esmail Charkhloo[1,2], Hamid Reza Sobhi[3], Ali Esrafili[1,2], Mitra Gholami[1,2]*

[1] Research Center for Environmental Health Technology, Iran University of Medical Sciences, Tehran, Iran.
[2] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran.
[3] Department of Chemistry, Payame Noor University, Tehran, Iran.

***Corresponding author:** Mitra Gholami, gholamim@iums.ac.ir

Abstract

Photocatalytic processes have received significant attention over the last decades. This systematic study along with meta-analysis is aimed at reviewing a vast number reports on the application of the above-mentioned methods used for the degradation of Insecticides in aqueous solutions.

Initially, the relevant articles over the last decade (2011-2020) were selected for the meta-analysis and subsequently systematically reviewed. In addition, the statistical analyses were performed by the R software. All studies were carefully reviewed by two independent researchers. Following a thorough screening, 375 articles were found to be suitable. Of which, 93 were finally selected which met the required quantitative criteria.

The pooled results on the selected articles revealed that the photocatalytic processes have gained lots of interest among the researchers. Results of meta-analysis proved that the photocatalytic processes could remove Insecticides with an average acceptable degradation efficiency of 64.55%. The average pooled percent of photocatalytic processes for the degradation of organophosphates, pyrethroids and carbamates was 92.92 (95 % CI: 89.19-96.66), 98.76 (95 % CI: 96.28-101.24) and 96.22 (95 % CI: 92.62-100.61), respectively. The Q-statistic, I^2 statistic, and Tau^2 test all confirmed a high level of heterogeneity in this study. Finally, it was demonstrated that photocatalytic processes are highly appropriate for the degradation of insecticides from aqueous solutions.

Keywords: Systematic review, Meta-analysis, Photocatalytic processes, Insecticides

Optimization of Ciprofloxacin removal from Aqueous Solutions by Granular Ferric Hydroxide

Mahdi Asadi-Ghalhari[2], Fatemeh sadat Tabatabaei[1], Rahim Aali[2], Fatemeh Najafzadeh[1], Amin Kishipour[1], Roqiyeh Mostafaloo[1*]

[1] Student Research Committee, Qom University of Medical Sciences, Qom, Iran.
[2] Research Center for Environmental pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran.

***Corresponding author**: Email: R.moostafaloo@gmail.com

Abstract

Background: Granular ferric hydroxide is a porous iron where that used as an adsorbent for the removal of various pollutants in potable water systems. Ciprofloxacin is known as an emerging pollutant in the aquatic environment.

Materials and Methods: In this study, to gain an understanding of the adsorption process of CIP by GFH, the performance of GFH is evaluated by using response surface methodology. The effects of pH, initial CIP concentration, adsorbent dose, and contact time on the adsorption rates of CIP were investigated.

Results: The results of optimization of the variables derived in the initial pH= 7.5, CIP concentration were 6.05 mg. L^{-1}, adsorbent dosage= 1.39 g. L^{-1}, and contact time= 27.5 min, maximum removal efficiency of 42.31% and desirability 0.987. According to RSM, this study follows the Quadratic model (R^2 = 0.969).

Conclusions: Considering the good quality, economic, and feasibility aspects, adsorption with GFH is recommended as a successful pre-treatment for CIP removal from various aqueous solutions.

Keywords: Adsorption, Aqueous solution, Ciprofloxacin, Granular ferric hydroxide

Improvement of UV/ZnO Process Efficiency in the Decomposition of Butyl Paraben and Benzyl Paraben in the Presence of an External Oxidant

Amir Sheikhmohammadi [1], Bayram Hashemzadeh [2], Rahim Sharafkhani [3], Esrafil Asgari [4*]

[1] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; a_sheikhmohammadi@khoyums.ac.ir.
[2] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; bayramh53@gmail.com.
[3] Department of Health, Khoy University of Medical Sciences, Khoy, Iran; r_sharafkhani@yahoo.com.
[4] Department of Environmental Health Engineering, Khoy University of Medical Sciences, Khoy, Iran; esrafil_asgari@khoyums.ac.ir.

***Corresponding author:** Esrafil Asgari

Abstract

This study was carried out to investigate the photocatalytic removal of benzyl paraben and butyl paraben using UVC/ZnO process in the presence of H_2O_2 from aqueous solutions. Complete degradation of butyl paraben and benzyl paraben was observed when H_2O_2 was added to the solution. Kinetic studies showed robs value for the removal of benzyl paraben, for the process (UVC/ZnO) in the presence of H_2O_2, was about 1101.6, 367.22 and 27.31 times higher than that of ZnO, UV and UZ, whereas robs for removal of butyl paraben was about 6, 105 and 302 times higher than UV/ZnO, UV alone and ZnO alone. It was found that the amount of electrical energy consumed for (UVC/ZnO) in the presence of H_2O_2 in the removal of both pollutants is much lower than other processes, so this process can be an attractive process for environmental applications. According to the results, the optimal range of parameters was obtained with complete degradation of both parabens pH 9.0, reaction time of 90 min, ZnO 1 g/L and hydrogen peroxide 100 mg/L.

Keywords: UV/ZnO process, Butyl paraben, Benzyl paraben and H_2O_2

The Efficiency of Crude Enzyme Extracted from Horseradish Root in Oxidation of Ciprofloxacin from Synthetic Wastewater

Farzaneh Javan [1], Fathollah Gholami-Borujeni [2]*, Mohammad Ali Zazouli [3]

[1] MSc student in Environmental Health Engineering, Faculty of Health, Mazandran university Sciences, Sari, Iran.
[2] Associate professor, Department of Environmental Health Engineering, Faculty of Health, Mazandran University of Medical Sciences, Sari, Iran.
[3] Professor, Department of Environmental Health Engineering, Faculty of Health, Mazandran University of Medical Sciences, Sari, Iran.

***Corresponding author:** Fathollah Gholami-Borujeni

Abstract

Background and purpose: So far, various methods for removing antibiotic residues in aqueous media have been studied. In this study, the efficiency of using the crude enzyme extracted from Radish root in the presence of hydrogen peroxide to removal of ciprofloxacin was investigated.

Materials and Methods: In an experimental study on laboratory scale, the effect of contact time variables, hydrogen peroxide concentration, antibiotic concentration, enzyme concentration, and pH on the efficiency of the enzyme extracted from Horseradish root in ciprofloxacin antibiotic removal was investigated. Efficacy of crude extract in different concentrations of ciprofloxacin antibiotics (10, 20, 30, 40 and 50 mg / l) and oxygenated water concentration with 30% purity (1, 2, 3, 4 and 5 mg / l) and time (10, 30 and 60 minutes) And was calculated at pH (4, 7 and 9) and extract efficiency at concentrations (10, 30 and 50 ml / L). To measure the efficiency of the enzymatic process, the residual concentration of antibiotic after the process, ciprofloxacin concentration was measured using an HPLC device equipped with a reverse phase column (C18, 0.05 µm. 250 × 4.6 mm). The concentration of ciprofloxacin was 1 ml per minute and the injection volume was 40 µl. The mobile phase of 0.01 M acetonitrile was measured with phosphate (8:92) and the wavelength was 220 nm. All experiments were performed at laboratory temperature.

Results: The results showed that the optimal pH was 7. Under optimal conditions, the initial concentration of antibiotics (10 mg / L), contact time of 10 minutes, and the efficiency of the extracted Horse radish peroxidase enzyme in the removal of ciprofloxacin was 76%.

Conclusion: The process of crude HRP extract is economical due to the abundance of plant sources and the suitability of the plant in terms of availability and cost, can be used as catalyst to oxidation of pollutants.

Keywords: Crude extract of Horseradish peroxidase, Enzymatic process, Ciprofloxacin. Medicinal wastewater

Isolation and Identification of Bacteria from Diesel Fuel Contaminated Soil and Study on Removal of Diesel Fuel from Water by these Bacteria

Ramazan Ali Dianati Tilaki [1], Kobra Zabihzadeh [2], Masoumeh Eslamifar [3]

[1] Associate professor, department of environmental health, Mazandaran University of Medical Sciences, Sari-Iran. Email: dianati.tilaki@gmail.com
[2] Msc. Student of environmental health, faculty of health, Mazandaran University of Medical Sciences, Sari-Iran.
[3] Msc. of microbiology, department of environmental health, faculty of health, Mazandaran University of Medical Sciences, Sari-Iran.

Abstract

Introduction : Identification of petroleum oil-degrading bacteria is important in the development of biological treatment methods. The purpose of this study was isolation and identification of bacteria from diesel fuel contaminated soil and study in their ability to remove diesel fuel from water.

Material and Methods: Diesel fuel contaminated soil samples were collected from Jouybar city. Five strains that had more growth were selected and identified based on standard test. Bacteria were individually contacted to 100, 500 and 1000 ppm of diesel fuel at 2, 5, 7 and 14 days of contact time. The Total Petroleum Hydrocarbon (TPH) was extacted from water samples and measured by using ASTM D7066 method.

Results: The strains: *Alcaligenes faecalis*, *Enterobacter aeruginosa*, *Acinetobacter*, *Proteus and Pseudomonas aeruginosa* were isolated and identified. *Alcaligenes faecalis* (65%) showed the highest and *Pseudomonas aeruginosa* (19.7%) the lowest removal within 48 hours at initial concentration of 100 ppm. The rate of removal by *Enterobacter* bacteria and *alcaligenes* at concentrations of 500 ppm and similar contact time were 42.5 and 19.6%, respectively. At 1000 ppm concentration, the highest removal was observed in *Enterobacter* (29.6%) and the lowest (2.5%) was in *Alcaligenes*. The maximum removal time of 14 days was 90% (100 and 500 ppm) and 50% (1000 ppm) for all bacteria except *Pseudomonas spp*.

Conclusion : Total petroleum compounds removal rate depends on the initial concentration of bacteria and generally, bacteria have a high potential for biodegradation of petroleum hydrocarbons.

Keywords: Total petroleum hydrocarbon, Water, Bacteria, Removal

Disinfection Technology and Management Strategies for Infectious Waste during COVID-19 Pandemic

Arezo Rezaie [1, 2], Mehdi Mokhtari [1], Seyedeh Mahtab Pormazar [1,2*]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School
of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Student Research Committee, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

***Corresponding author:** Seyedeh Mahtab Pormazar; Email address: smp.mahtab@gmail.com

Abstract

The COVID-19 pandemic has altered waste generation dynamics due to the widespread use of face masks, gloves and other personal protective equipment. The COVID-19 pandemic has altered waste generation dynamics and createsd global challenges in waste management. Inadequate and inappropriate handling of healthcare waste may have serious public health consequences and a significant impact on the environment. Henceforth, in the present article, disinfection technologies for handling COVID-19 waste from its separate collection to various physical and chemical treatment steps have been reviewed. Furthermore, evaluates prevailing COVID-19 waste management practices, with the emphasis on waste treatment and disposal facilities in select developed and developing countries. The data and information used in this paper is collected from several scientific research papers from different disciplines, publications from governments and multilateral agencies and media reports. The results show that, chemical disinfection using a 1% NaOCl solution is one of the best in-situ practices which is also easy to spray and not limited to COVID-19 waste but it is also effective to sanitize the larger space Despite limited literature on waste management during such pandemics, this article presets a global backdrop of waste management during COVID-19 outbreak and examines various aspects of waste management. This paper can be very important for the development of strategies and alternative methods for sustainable waste management in the current situation and similar epidemics in the future.

Keywords: COVID-19 Pandemic, Infectious waste, Personal protective equipment, Sustainable waste management

Heterogeneous Photocatalytic Degradation of Tetracycline from Aqueous Solutions using Fe_3O_4/TiO_2 supported on Biochar

Roshanak Rezaei Kalantary[1], Mitra Gholami[2], Hajar Tabarinia[3], Hosseinali Asgharnia[4], Fatemeh Asgharzadeh[5*]

[1] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran (rezaei.r@iums.ac.ir)
[2] Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran (gholamimitra32@gmail.com)
[3] Department of Environmental Health Engineering, School of Public Health, Babol University of Medical Sciences, Babol, Iran(forough_tabari85@yahoo.com)
[4]Department of Environmental Health Engineering, School of Public Health, Babol University of Medical Sciences, Babol, Iran(ehaamin2@gmail.com)
[5]Department of Environmental Health Engineering, School of Public Health, Babol University of Medical Sciences, Babol, Iran (asgharzadeh.59@gmail.com)

***Corresponding author:** Fatemeh Asgharzadeh (asgharzadeh.59@gmail.com)

Abstract

The Fe_3O_4/TiO_2/BC composite was used as a photocatalyst to remove tetracycline from aqueous environments. The effect of different parameters such as pH, contact time, composite dose, and initial tetracycline concentrations on the removal efficiency was investigated. Composite specifications were detected by field emission scanning electron microscopy, energy dispersive X-ray, X-ray diffraction, Fourier transform infrared spectroscopy, Brunauer–Emmett–Teller, and vibrating sample magnetometer analyses. pH = 7 was selected as the optimal value with respect to composite pH_{zpc} and pKa values of the tetracycline. The tetracycline removal efficiency increased with increasing composite concentrations (0.25–0.35 g L^{-1}). Also, the maximum efficacy was obtained at a composite concentration of 0.35 g L^{-1}. With increasing initial antibiotic concentration (10–40 mg L^{-1}), the efficacy decreased from 97% to 83%. The kinetic data suggest that the photocatalytic removal of tetracycline followed the first-order kinetic model. The removal efficiency of 89% was maintained after five steps of the composite application. The main mechanism involved in the photocatalytic removal of tetracycline is hydroxyl radicals ($OH^{\bullet}$), holes (h^{+}), and superoxide radicals ($O_2^{-\bullet}$).

Keywords: Fe_3O_4/TiO_2/BC composite; Tetracycline; Photocatalyst degradation

Removal of Antibiotic from Water and Wastewater by a New Magnetic Nano-Adsorbent

Mohammad Malakootian [1,2], Marziyeh Ansari Shiri [1,2,3]*

[1] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran.
[2] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran.
[3] Student Research Committee, Kerman University of Medical Sciences, Kerman, Iran.

***Corresponding author:** Tel: 98-9036096650, E-mail: marziyehansari566@gmail.com,

Abstract

In this study, Fe_3O_4@Cuttlebone as a novel magnetic nanocomposite was synthesized by co-precipitation method. Then, it structurally evaluated by FESEM, EDS, Mapping, BET, VSM, XRD, TGA, and FTIR. Effective parameters on tetracycline removal such as pH, initial TC concentration, adsorbent dosage, and contact time were examined. The central composite design (CCD)–based response surface methodology (RSM) was employed to design the experiments and find optimal conditions. Fe_3O_4@Cuttlebone was synthesized at the nanometer scale (approximately 31 nm), with magnetic properties and high specific surface area. The quadratic model was presented as the best model to describe the adsorption process by Design expert software. Optimal conditions for tetracycline adsorption were at pH 5, initial tetracycline concentration 8 mg /L, adsorbent dose 2 g/L, and contact time 90 min. The maximum tetracycline adsorption efficiencies using Fe_3O_4@Cuttlebone from synthetic and real wastewater samples under optimal conditions were 80.15% and 75.34%, respectively. Therefore, Fe_3O_4@Cuttlebone nanocomposite can be applied as a good and practical adsorbent for removing tetracycline from synthetic and real wastewater.

Keywords: Antibiotic; Tetracycline; Magnetic nanocomposite; Aqueous solution; Central composite design

Survey of Efficiency Removal of Trichloroethylene from Aqueous Solutions by Modified Clay with Tetradecyl Trimethyl Ammonium Bromide Cationic

Fazel Mohammadi-Moghadam[1], Abbas Khodabakhshi[2], Marzieh Farhadkhani[3], Sara Hemati[4], Firoozeh Shahgholian[5*], Heshmatollah Nourmoradi[6], Farideh Bagherzadeh[7]

[1]Associate Professor of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Shahrekord, Iran. E-mail: fm.moghadam@skums.ac.ir
[2]Associate Professor of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: khodabakhshi16@gmail.com
[3]Assistant Professor of Environmental Health, Educational Development Center, Shahrekord University of Medical Sciences, Iran; Email address: m_farhadkhani@yahoo.com
[4]Ph.D Student of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: hemati.sara88@yahoo.com
[5] Masters of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord Associate Professor of Environmental Health, University of Medical Sciences, Iran; Email address: f.shahgholian66@gmail.com
[6]Associate Professor of Environmental Health, Department of Environmental Health Engineering, School of Health, Ilam University of Medical Sciences, Ilam, Iran. Email address: ilam_nourmoradi@yahoo.com
[7] Masters of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: farideh.b71@gmail.com

***Corresponding Author**: Firoozeh Shahgholian, Masters of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran. Tel: +98-383-3336712, Fax: +98-383-3334678, E-mail: f.shahgholian66@gmail.com

Abstract

Background and Aim: in recent decades much of hydrocarbon pollutants inter the environment, as a result of industrial improvement.Trichloroethylene (TCE) is the most reported pollutant in groundwater, which creating a variety types of cancers in human specifically in kidney, liver, iymphatic gland and spinal cord.

The aim of this study was to investigate the removal efficiency of TCE from aqueous solution by modified clay with tetradsilyl-methyl-ammonium-bromide (TTAB) cationic surfactant.

Methods: In this experimental study, the morphology of the adsorbent was analyzed using scanning electron microscopy, and to determine the characteristics of raw and modified adsorbents FT-IR and XRD techniques were used .The effect of contact time, contaminant concentration, pH, adsorbent dose, and surfactant loading parameters on the adsorption process were investigated and the obtained data were analyzed via Excel software.

Results: The maximum TCE sorption by the modified clay was obtained at surfactant loading rate of 120% cation exchange capacity of the clay. The maximum removal efficiency of TCE by the modified clay was 99.6% at pH 5 within 5 h contact time. The findings also exhibited that the isotherm followed the Freundlich (R^2 = 0.99).

Conclusion: The results showed that the modified clay with TTAB has a good ability to remove TCE from aqueous solutions. Therefore, this compound can be used as a low cost, inexpensive, and powerful adsorbent to remove trichloroethylene from aqueous solutions.

Keywords: Trichloroethylene, Adsorption, Cationic Surfactant, Clay soil

Bioremediation of Soils Contaminated with Diesel in Bioreactors Containing Rhamnolipid Biosurfactant and Mixture of Vermicompost and Raw Activated Sludge

Behnaz Abdollahinejad [1], Mahdi Farzadkia [1,2*]

[1] Research Center for Environmental Health Technology, Iran University of Medical Sciences, Tehran, Iran (Behnazabdollahinejad94@gmail.com).
[2]Professor, Department of Environmental Health Engineering, School of Public Health, Iran University of Medical Sciences, Tehran, Iran. (Mahdifarzadkia@gmail.com).

***Corresponding author:** Mahdi Farzadkia

Abstract

Nowadays, soil pollution with total petroleum hydrocarbons (TPH) is one of the major environmental issues caused serious problems to human and other living organisms .One of the best and most reliable methods for bioremediation is the use of surfactant. In this study, bioremediation of gasoline-contaminated soil using Rhamnolipid biosurfactant, the mixture of activated sludge and compost was evaluated. In order to determine the efficiency of bioremediation to removal gasoline from contaminated soil, cow compost and urban sewage sludge with a weight ratio of 1: 0.35:0.25, was used. Experiments were carried out in 6 reactors with different concentrations of diesel (10 and 30 g / kg soil), a different level of Rhamnolipid biosurfactant ambient temperature during 60 days. To compare the performance of biodegradation of gasoline using Rhamnolipid biosurfactant, two control reactors, containing only contaminated soil with two ratios of gasoline, vermicompost, and activated sludge, were used. The (TPH) decomposition rate was measured by GC-FID. Results of this study were analyzed by Minitab software (version 17). The results of this study show that the highest removal efficiency of hydrocarbons in gasoline-contaminated soil is observed in reactor No.2 with characteristics (Soil polluted with 10 g / kg of soil + maximum level of Rhamnolipid biosurfactant,+ vermicompost + Activated sludge) .Also, the lowest removal efficiency of hydrocarbons in diesel-contaminated soil was observed in reactor R1 (containing vermicompost + raw activated sewage sludge + gasoline-contaminated soil sample 30 g / kg soil + minimum level of Rhamnolipid biosurfactant). Therefore, based on the results of the present study, reactors containing biosurfactants in low concentrations of petroleum hydrocarbons have good removal capability, but in medium to high concentrations due to toxicity did not show an acceptable ability to remove petroleum hydrocarbons. Overall, the bioremediation methods stimulated with Rhamnolipid biosurfactant,+ vermicompost + Activated sludge is a promising technology to remove significantly the ptreleum hydrocarbons from contaminates soil area.

Keywords: Bioremediation; Total petroleum hydrocarbons ; Rhamnolipid biosurfactant ; Vermicompost; Activated sludge

A Review on Fabrication of Activated Carbon from Waste for Absorption of Phenol and its Derivatives from Synthetic Wastewater

Ali Fatehizadeh [1], Ensiyeh Taheri [2], Sousan Hadi [3]*

[1] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan.
[2] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan.
[3] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan.

Abstract

Rapid population growth and industrial development are leading to the release of organic compounds into water resources. There are more than 50,000 organic compounds in the world today. The presence of these compounds causes water pollution and endangers the environment. This contamination occurs when harmful compounds enter water sources without adequate treatment. This leads to the use of high performance removal methods. Phenols are organic compounds that have attracted much attention due to their toxicity even at low concentrations and therefore must be effectively removed from these effluents. Commercially activated carbon is an adsorbent for the removal of pollutants from the aqueous phase. However, its widespread use is limited due to its high cost. To reduce costs, efforts have been made to use inexpensive activated carbon precursors such as waste. The adsorption of phenol and its derivatives on activated carbon from waste materials has been investigated based on several articles. However, the results of these studies are limited to the precursors and specific methods they have used, while the present work evaluates and compares the types of precursors and methods used in previous studies. Equilibrium isotherm data of the studies showed that the adsorption process is suitable for both Freundlich and Langmuir models and the adsorption process can be described by a quasi-quadratic kinetic model. Studies show that low-cost sorbents such as sorbents obtained from agricultural waste have a high potential for the removal of phenolic compounds and their derivatives.

Keywords: Pollutant Removal, Phenol, Adsorption, Activated carbon

Photocatalytic Degradation of Ciprofloxacin from Aqueous Media with $CuFe_2O_4$@Methyl Cellulose as a New Magnetic Nanophotocatalyst

Alireza Nasiri [1], Majid Nozari [2,*]

[1] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran. Email:
[2] Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran.

***Corresponding author:** Majid Nozari

Abstract

Water pollution from various sources, such as pharmaceutical industries, hospital wastewater and the disposal of humans and animals from aquatic environments, causes environmental problems in grand water and underground resources water. Meanwhile, antibiotics such as ciprofloxacin (CIP) are even more important in bacterial resistance, even at low concentrations. The aim of this research was to prepare $CuFe_2O_4$@Methyl cellulose as a new nano-photocatalyst for degradation of ciprofloxacin from aqueous solution. At first, $CuFe_2O_4$@methyl cellulose magnetic nano-biocomposite was prepared and analyzed by FESEM, EDS, VSM, and TGA/DTA/DTG. Later, $CuFe_2O_4$@methyl cellulose was used as photocatalyst in the photocatalytic degradation of CIP. Factors affecting to the photocatalytic degradation of CIP include irradiation time, initial antibiotic concentration, pH, photocatalyst loading, and kinetic of the process were investigated. The structural characterization of the magnetic nanobiocomposite showed that it is in nanoscale, ferromagnetic property, and thermal stability. The highest removal efficiency of CIP from aqueous solution was obtained 80.74% at optimal conditions. The optimal conditions was obtained pH = 7, 90 min irradiation time, 0.2 g photocatalyst loading, and 3 mg/L initial concentration of CIP. The evaluation of kinetic linear models showed that the photocatalytic degradation process fitted by pseudo-first order kinetic model and Langmuir-Hinschwold. $CuFe_2O_4$@methyl cellulose photocatalyst has good stability and reusability for fourth runs. The removal efficiency of CIP after fourth runs was obtained 73.78%. The photocatalytic CIP degradation from aqueous media with $CuFe_2O_4$@methyl cellulose photocatalyst has a high efficiency, which can be used in the treatment of pharmaceutical wastewaters.

Keywords: Magnetic nano-biocomposite, Ciprofloxacin, Photocatalyst, Water

Treatment of Wastewater from Paper Recycling Industries by Coagulation and Flocculation Process and Optimization of Treatment Conditions by Response Surface Method (RSM)

Tahereh Zarei Mahmoudabadi [1], Hadi Eslami [2*], Mohammad Hassan Ehrampoush [3], Parvaneh Talebi [4]

[1] M.Sc., Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Faculty of Health, Shahid Sadoughi University of Medical Sciences, Yazd. Iran. Email address; Taherehzarei92@gmail.com
[2] Assistant Professor, Research and Work Environment Center, Department of Environmental Health Engineering, Faculty of Health University of Medical Sciences, Rafsanjan. Iran. Email address; Hadieslami1981@yahoo.com
[3] Professor, Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Faculty of Health, Shahid Sadoughi University of Medical Sciences, Yazd. Iran. Email address; Ehrampoush @ssu.ac.ir
4 M.Sc., Environmental Science and Technology Research Center, Department of Environmental Health Engineering, Faculty of Health, Shahid Sadoughi University of Medical Sciences, Yazd. Iran. Email address; apf_sts_1381@gyahoo.com

***Corresponding author:** Hadieslami, Assistant Professor, Research and Work Environment Center, Department of Environmental Health Engineering, Faculty of Health University of Medical Sciences, Rafsanjan. Iran.
Email address; Hadieslami1981@yahoo.com

Abstract

Aim of study: Wastewater treatment of paper industries, paper recycling and fiber products with the aim of recycling water and reducing environmental damage is one of the needs of the wastewater treatment industry in the world. Therefore, the aim of this study was to optimize the conditions of coagulation and flocculation process in wastewater treatment of paper recycling industries using the response surface method.

Methodology: This was an experimental study that was performed on a laboratory scale. Response surface methodology and central composite design of experiments designed to determine the effects of variables (pH, concentration of alum and cationic polyelectrolyte) was used.

Results: The results showed that in combination of poly aluminum chloride with cationic polyelectrolyte (optimal conditions; pH = 7.5, concentration of poly aluminum chloride = 450 mg/L, concentration of cationic polyelectrolyte = 1.5 mg/L TSS and COD removal efficiencies were 97.34 and 75.76 Percentage, respectively. Then by combining alum with cationic polyelectrolyte (optimal conditions; pH = 8.5, alum concentration = 550 mg/L, cationic polyelectrolyte concentration = 2 mg/L) removal efficiency of TSS and COD 96.98 and 77.83 Percentage was obtained. The results also showed that two independent variables of pH and concentration and their interactions had significant effects on the removal of TSS and COD variables.

Conclusion: The combination of poly aluminum chloride with cationic polyelectrolyte is suggested as an effective compound for reducing pollutants in wastewater of paper recycling industries. This process can be used as a pretreatment method, for biological treatment when biological treatment is used as the main method.

Keywords: Chemical coagulation, Optimization, Paper recycling industries, Wastewater treatment, Response surface methodology

Photocatalytic Removal of Toluene from Air by using TiO_2 Loaded Glass-Foam

Ramazan Ali Dianati Tilaki [1*], Esmaeil Babanejad [2], Seyedeh Maryam Adhami [3]

[1] Associate Professor, department of environmental health, Mazandaran University of Medical Sciences, Sari-Iran, Email address: dianati.tilaki@gmail.com. *Corresponding Author
[2] Assistant Professor, department of environmental health, Mazandaran University of Medical Sciences, Sari-Iran
[3]Msc. student of environmental health, department of environmental health, Mazandaran University of Medical Sciences, Sari-Iran

Abstract

Importance and Aims: Toluene is a harmful chemical that is released into the air in many workplaces. One method to remove this compound from the polluted air is photocatalytic decomposition. The aim of this study was to use glass foam as support media for TiO_2 and determine the efficiency of toluene removal from air passing through a quartz filter containing glass foam loaded with TiO_2 under irradiation by UV and visible light.

Method: In this study, the glass foam was used as support for TiO_2 loading. Nanoparticles of TiO_2 in the anatase phase were contacted with glass foam particles by impregnation method and stabilized on glass foam surface. Glass foam pellets containing TiO2 nanoparticles were filled into a quartz tube (as a filter). UV and visible lamps were installed near the filter. The filter was connected to the air intake pump and the whole set was placed inside a glass container with a lid. By injecting certain volumes (microliters) of toluene into a closed glass chamber, the inside air was contaminated with toluene. By suctioning the pump, polluted air passed through a quartz filter containing a catalyst, and toluene was decomposed by UV light. FTIR, BET, SEM, XRD tests were used to evaluate the TiO_2 loaded glass foam particles characteristics.

Results: For experiment set-up including glass-TiO_2/UV-C ، glass-TiO_2/UV-A and glass-TiO_2/Vis. Toluene removal efficiencies were 100, 91.2, and 88%, respectively. To remove 10 ppm toluene, the removal efficiencies under the same conditions were 97.5%, 90.2% and 81%, respectively. To remove 15 ppm toluene, the removal values under the same conditions were 93.4%, 87.3% and 70%, respectively. To remove 15 ppm toluene, the removal values under the same conditions were 93.4%, 87.3% and 70%, respectively.

Conclusion: Loading of TiO2 on glass foam pellets significantly increased the removal efficiency of toluene from air. Using this method can be a good way to remove toluene vapors in industrial environments.

Keywords: Glass Foam, Photocatalyst, Toluene, Titanium Dioxide Nanoparticles and ultraviolet ray

Application of Remote Sensing in Environmental Monitoring

Maryam Paydar [1], Masoud Derakhshi [2]

[1*] MSc, Environmental health specialist, Department of Environmental Health Engineering, faculty Health, Mashhad University of Medical Sciences, Mashhad, Iran. Email: Paydarm1@mums.ac.ir
[2] MSc, Lecturer of Khorasan Razavi Agricultural and Natural Resources Education and Research center; Email mdrakhshi@gmail.com

Abstract

Remote sensing is the art of obtaining information about an object, area, or phenomenon through analysis of data gained by tools that are not in physical contact with the case studied.

Today remote sensing has wide applications in many scientific and research fields related to spatial information. The most important applications of remote sensing data are the study of dynamic and changing phenomena over time, including geology, hydrology, mining, fisheries, cartography, geography, geographic information systems, meteorology, agriculture, environmental studies, and management in general. Land resources can be mentioned. Most usual applications of satellite imagery and remote sensing are environmental evaluation, the study of the current situation and environmental monitoring. Due to its integrity and breadth, spectral diversity, providing duplicate coverage and cheapness, remote sensing data has special capabilities compared to other data collection methods. Today, these data are the first factor in the study of the earth's surface and its constituent factors. Digital data has made it possible for computer systems to use this data directly. Spatial data systems and satellite data processing systems have been designed and developed using this feature. Easy access to data, quick access to remote areas, and their high accuracy are among the special advantages of this technique. Studies on the emission of pollutants air such as particulate matter, greenhouse gases (ozone, NO) and the prevalence of chronic respiratory diseases related to pollutants, predicting malaria epidemic and tracking Vectors by tracking rainfall and temperature via satellites, Emission of pollutants from the landfill, the selection of the landfill and a suitable site for wastewater treatment have been done with the Remote sensing. Since the sensors are designed with special capabilities and expertise, environmental health professionals can use satellite imagery and remote sensing techniques to more accurately study environmental pollutants nationally and regionally. It should be noted that the use of remote sensing methods to model and predict environmental pollutants is a new work and its application should be strengthened with the cooperation of remote sensing researchers and health scientists in research projects.

Keywords: Remote Sensing - Environmental Pollutants – Monitoring

Optimization of COD Removal from Olive Oil mill Wastewater by Combined Electrocoagulation and Proxone Process: Modeling and Determination of Kinetic Coefficients

Yousef Dadban Shahamat [1], Farshad Hamidi [2], Samaneh Dehghan [3], Mina Ghahrchi [4*], Paniz Nikseyr [5]

[1]Environmental Health Research Center, Department of Environmental Health Engineering, Faculty of Health, Golestan University of Medical Sciences, Golestan, Iran
[2] MSc, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
[3] Department of Environmental Health Engineering, School of Public Health, Mazandaran University of Medical Sciences, Sari, Iran
[4] Department of Environmental Health Engineering, Torbat Jam Faculty of Medical Sciences, Torbat Jam, Iran
[5] Department of Environmental Health Engineering, Faculty of Health, Golestan University of Medical Sciences, Gorgan, Iran

Abstract

The olive oil extraction industry is one of the most extensive industries, especially in the Mediterranean region. Wastewater produced in this industry contains high concentrations of organic pollutants, resistant and toxic compounds that, if not treated, can threaten the health of the environment. In the present study, the optimization of the combined process of electrical coagulation and proxon was performed using the RSM – CCD in Design-Expert V11 Software.

The studied parameters in the process of electrical coagulation are the effect of voltage (3-13 v) and reaction time (5-45 min) and in the proxon process the effect of hydrogen peroxide concentration (4-12 ml) and reaction time (10-90 minutes) on the CCD removal efficiency.

The design results showed that the quadratic model was significant for both processes and was determined as the selected model. The results obtained from the ANOVA of the design based on this model in the electrocoagulation process showed that the voltage and reaction time have a significant effect on the COD removal efficiency (p-value <0.0001) and with increasing these two parameters, the efficiency also increases. In the proxone process, the concentration of H_2O_2 and reaction time had a significant effect on the removal efficiency of COD.

The optimal conditions determined by the software in the process of electrical coagulation were 10.25 volts and 34 minutes and in the Proxon process a concentration of 11.99 ml of hydrogen peroxide and a time of 61.95 minutes. 79.8% and 52.8% efficiency of the processes were determined, respectively.

Under optimal conditions, in proxone process consumption of ozone was reduced to 0.88 mg per mg of COD removed. Also, the results of Pseudo-first-order kinetics indicate a constant increase in the reaction rate with increasing concentration of hydrogen peroxide.

The results obtained in this study confirm the application of electrocoagulation process along with advanced oxidation of proxone for effective treatment of effluents of this industry and similar industries.

Keywords: Olive Oil , COD , RSM , Electrocoagulation , Proxone

Optimization of Energy Consumption and sludge generation in Amoxicillin Antibiotic Removal from Aqueous Solutions by Electrofenton Process using Response Surface Methodology

Akram Ghorbanian[1], Hosein Alidadi[2], Elham Rahmanzadeh[3], Faride jamali behnam[4], Mahdi Ghorbanian*[5]

[1] Department of environmental health engineering, Mashhad University of Medical Sciences, Mashhad, Iran; Email address (Ghorbaniana64@yahoo.com)
[2] Professor, Social Determinants of Health Research Center, Mashhad University of Medical Sciences, Mashhad, Iran; Email address (alidadih@mums.ac.ir)
[3] Department of Occupational Health Engineering, Faculty of Health, North Khorasan University of Medical Sciences, Bojnurd, Iran; Email address (e.rahmanzadeh@gmail.com)
[4] Department of Civil and Natural resources Engineering, **University of Canterbury, Christchurch, New Zealand**; Email address (fjbehnam2009@yahoo.com)

***Corresponding author:** Department of environmental health engineering, North Khorasan University of Medical Sciences, Bojnurd, Iran; Email address (ghorbanian82@gmail.com)

Abstract

Introduction: Antibiotics are one of the most useful medications in human medicine and veterinary which are present in domestic, hospital, and pharmaceutical industry sewage. Non- biodegradability, highly toxicity, carcinogenic and teratogenic effects, ability to hurt DNA and lymphocytes, increasing allergic reactions in humans and expanding resistant bacteria to antibiotics will lead to health and environmental hazards if they're not removed from wastewater. Therefore, this study aimed to Optimization of energy consumption and sludge generation in amoxicillin antibiotic removal from aqueous solutions by electrofenton process.

Methods: This experimental study was done in a glassy reactor in laboratory scale with the use of ferrous electrodes. The impact of effective variables including; reaction time (1-10 minutes), electrical current density (1-10 $^{mA}/_{cm^2}$), electrode distance (1-3 cm), hydrogen peroxide concentration (1-10 $^{mM}/_{L}$), pH (2-12) and initial amoxicillin concentration (10-100 $^{mg}/_{l}$) produced sludge volume and consumed amount of energy was studied. 50 samples were taken with regard to the Central Composite Design (CCD) and results were analyzed by Response Surface Methodology (RSM) and Design Expert7 software and statistical tests including analysis of variance and regression.

Results: Results showed that in optimized conditions (electrical current density 5.5 $^{mA}/_{cm^2}$, pH = 12, 50 mg/l initial concentration of amoxicillin, 7.39 mM concentration of hydrogen peroxide and 1.58 cm of electrode distance) amoxicillin removal efficiency was 100 percent, consumed energy was 705.379 Wh/m^3 and the sludge volume was 20.59 ml. Statistical tests (ANOVA and regression) showed that the model had a highly accordance with lab results.

Conclusion: This study showed that Electro-Fenton process is an efficient way for removing amoxicillin antibiotic from wastewater of its manufacturing industries.

Key words: Amoxicillin, Electro-Fenton, Wastewater, Response surface methodology

Survey of Efficiency Removal of Trichloroethylene from Aqueous Solutions by Modified Clay with Tetradecyl Trimethyl Ammonium Bromide Cationic

Fazel Mohammadi-Moghadam[1], Abbas Khodabakhshi[2], Marzieh Farhadkhani[3], Sara Hemati[4], Firoozeh Shahgholian[5*], Heshmatollah Nourmoradi[6], Farideh Bagherzadeh[7]

[1]Associate Professor of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Shahrekord, Iran. E-mail: fm.moghadam@skums.ac.ir
[2]Associate Professor of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: khodabakhshi16@gmail.com
[3]Assistant Professor of Environmental Health, Educational Development Center, Shahrekord University of Medical Sciences, Iran; Email address: m_farhadkhani@yahoo.com
[4]Ph.D Student of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: hemati.sara88@yahoo.com
[5] Masters of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord Associate Professor of Environmental Health, University of Medical Sciences, Iran; Email address: f.shahgholian66@gmail.com
[6]Associate Professor of Environmental Health, Department of Environmental Health Engineering, School of Health, Ilam University of Medical Sciences, Ilam, Iran. Email address: ilam_nourmoradi@yahoo.com
[7] Masters of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: farideh.b71@gmail.com

***Corresponding Author**: Firoozeh Shahgholian, Masters of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran. Tel: +98-383-3336712, Fax: +98-383-3334678, E-mail: f.shahgholian66@gmail.com

Abstract

Background and Aim: in recent decades much of hydrocarbon pollutants inter the environment, as a result of industrial improvement.Trichloroethylene (TCE) is the most reported pollutant in groundwater, which creating a variety types of cancers in human specifically in kidney, liver, iymphatic gland and spinal cord.

The aim of this study was to investigate the removal efficiency of TCE from aqueous solution by modified clay with tetradsilyl-methyl-ammonium-bromide (TTAB) cationic surfactant.

Methods: In this experimental study, the morphology of the adsorbent was analyzed using scanning electron microscopy, and to determine the characteristics of raw and modified adsorbents FT-IR and XRD techniques were used .The effect of contact time, contaminant concentration, pH, adsorbent dose, and surfactant loading parameters on the adsorption process were investigated and the obtained data were analyzed via Excel software.

Results: The maximum TCE sorption by the modified clay was obtained at surfactant loading rate of 120% cation exchange capacity of the clay. The maximum removal efficiency of TCE by the modified clay was 99.6% at pH 5 within 5 h contact time. The findings also exhibited that the isotherm followed the Freundlich (R^2 = 0.99).

Conclusion: The results showed that the modified clay with TTAB has a good ability to remove TCE from aqueous solutions. Therefore, this compound can be used as a low cost, inexpensive, and powerful adsorbent to remove trichloroethylene from aqueous solutions.

Keywords: Trichloroethylene, Adsorption, Cationic Surfactant, Clay soil

Investigation of Organic Matters Degradation by Hybrid Process Advance Oxidation Process of Ultrasonic and Photocatalyst

Majid Amiri Gharaghani[1] ,Hakimeh Mahdizadeh [2], Alireza Nasiri[2], Amir Naser Alibeigi[2], Mohammad Malakootian[2]*

[1] Department of Environmental Health Engineering, Sirjan School of Medical Science, Sirjan, Iran, email: amiri.majid76@gmail.com, amirnaser.alibeigi@gmail.com
[2] Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran, email: amirnaser.alibeigi@gmail.com, m.malakotian@yahoo.com, h.mahdizadeh2018@gmail.com

***Corresponding author:** Mohammad Malakootian, Environmental Health Engineering Research Center, Kerman University of Medical Sciences, Kerman, Iran (m.malakotian@yahoo.com)

Abstract

The aim of this study was to determine the amount of Acid Red 18 removal by the sonophotocatalyst process using ZnO nanoparticles. The ZnO nanoparticles were synthesized by the hydrothermal method and placed on a glass plate. The structure of the nanoparticles was investigated by XRD, and SEM, and the effects of the processes involved in the sonophotocatalyst process (photolysis, adsorption, sonolysis, sonocatalysis, and photocatalysis) were compared. The highest removal rate was 94% at the initial concentration of Acid Red 18 (25 mg/L) in pH = 10 and catalyst concentration of 1.66 g/L during 45 min.The stability of the synthesized and stabilized ZnO nanoparticles was investigated during five cycles (investigation reusability) in this process, and it was found that these nanoparticles have high stability. Therefore, the sonophotocatalyst process as a hybrid advanced oxidation process with high efficiency in a short period of time is able to degrade and remove resistant organic pollutants from the environment and can be employed in industrial applications.

Keywords: Sonophotocatalyst; Stabilization; Acid Red 18; Textile sewage; Advance oxidation process

Biodegradation of Azo Dye and Total Organic Carbon using Wastewater Treatment Sludge by Aerobic and Anaerobic Methods

Ramazan Ali Dianati Tilaki [1], Jalal Kazemi Tabar [2], Masoumeh Eslamifar [3], Hadi Ashkiod [4]

[1] Department of Environmental Health Eng., Faculty of Health, Mazandaran University of Medical Sciences, Km-18 Farah abad road, Sari-Iran
[2] Masters Student of Environmental Health Eng., Faculty of Health, Mazandaran University of Medical Sciences, Km-18 Farah abad road, Sari-Iran
[3] PhD Student of microbiology, Faculty of Health, Mazandaran University of Medical Sciences, Km-18 Farah abad road, Sari-Iran
[4] Bachelor of Environmental Health Eng., Faculty of Health, Mazandaran University of Medical Sciences, Km-18 Farah abad road, Sari-Iran

Abstract

Importance and objectives: Numerous studies on the biological removal of azo dyes have shown that the activated sludge method does not work well in the removal of azo dyes and anaerobic methods also lead to the formation of toxic by-products by partial decomposition of azo dyes. The aim of this study was to determine the removal rate of azo dye used in textile industry and also to determine the TOC removal rate by aerobic and anaerobic methods.

Materials and Methods: In this study, azo dye was dissolved in concentrations of 50 to 90 mg/L in medium containing water. Bacterial seed was used as secondary sludge treatment sludge tank sludge. The amount of sludge TSS of 560 mg/L was tested at 5 and 10 ml. In order to determine the amount of dye removal by metabolic method, cultures containing separate dye were placed in incubator at 30 ° C for eight days in both aerobic and anaerobic conditions. Concentration of residual dye was measured by spectrophotometric method at zero, 1, 2, 4 and 8 days after exposure. The TOC concentration of the samples was measured by TOC analyzer. Bacterial degrading bacteria were also isolated and identified in aerobic and anaerobic conditions according to standard method.

Results: The best time for dye removal is 2 days in aerobic conditions and 4 days in anaerobic conditions. The rate of dye removal in aerobic conditions at the end of 8 days was 98.34% and in anaerobic conditions was 94.99%. The TOC removal rates in aerobic and anaerobic conditions were 89 and 82 percent respectively. Bacterial species of Escherichia coli, Bacillus, Staphylococcus aureus, Pseudomonas aeruginosa in aerobic environment and bacterial species Lactobacillus, Enterococcus faecalis and Bacillus in anaerobic environment were identified.

Conclusion: It can be concluded that the absorption of chemical dyes by microorganisms is an efficient and effective method

Keywords: Azo dye, Activated sludge, Aerobic, Anaerobic, TOC

Feasibility Study of Total Removal of Petroleum Hydrocarbons from Water Contaminated with Petroleum Compounds by Advanced Oxidation Process

Mahdi Farzadkia[1, 2], Mahdi Ghorbanian[3], Mitra Gholami[1,2], Niloufar Borhani Yazdi[4], Ehsan Abouee Mehrizi[4]

[1] Research Center for Environmental Health Technology, Iran university of Medical Sciences, Tehran, Iran
[2] Department of Environmental Health engineering, School of Public Health, Iran university of Medical Sciences, Tehran, Iran
[3] Department of Environmental Health engineering, School of Public Health, North Khorasan University of Medical Sciences, bojnurd, Iran
[4] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

***Corresponding author:** Email: ehsan.abouee@gmail.com Tel number: 09120203237

Abstract

Background & objectives: One of the most important problems in water resources is the presence of petroleum compounds, especially in areas where oil exploration takes place. The discharge of oil water to water resources increases the presence of petroleum hydrocarbons in this study. Aqueous solutions (produced waters) have been investigated by advanced ozonation oxidation process.

Material & Methods: In the present study, conducted on an experimental scale, the impact of effective variables including; reaction time, PH ،Ozone Concentration and initial Total Petroleum Hydrocarbons Concentration The statistical software used in this study was Design Expert7 to determine the sample size and analyze the experiments.

Results: Optimal removal of petroleum compounds in the advanced oxidation process by TPH ozonation method was 73.3%, Statistical tests (ANOVA and regression) showed that the model had a highly accordance with lab results.

Conclusion: The results of this study showed that the use of advanced oxidation process in the oil field can be considered as a solution to reduce oil pollution in water resources.

Keywords: Water sources, Ozonation, Petroleum compounds, Central composite design

Comparitive Study of GC-FID and Gravimetric Methods for Improving Analysis of Heavy Petroleum Fractions from Oily Sludge

Mahdi Farzadkia[1, 2], Majid Kermani [1, 2], Ali Esarfili[1, 2], Mahdi Ghorbanian[3], Niloufar Borhani Yazdi[4], Ehsan Abouee Mehrizi[4]

[1] Research Center for Environmental Health Technology, Iran university of Medical Sciences, Tehran, Iran
[2] Department of Environmental Health engineering, School of Public Health, Iran university of Medical Sciences, Tehran, Iran
[3] Department of Environmental Health engineering, School of Public Health, North Khorasan University of Medical Sciences, bojnurd, Iran
[4] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

*__Corresponding author:__ Email: ehsan.abouee@gmail.com Tel number: 09120203237

Abstract

Bottom sludge of crude oil storage tanks is among the hazardous waste produced in refineries. Direct evacuation or disposal (accidents, crashes, or fracture of tubes and oil tanks), either intentionally or inadvertently, of such oily sludge on the ground leads to great dangers for the environment and human health. The most important environmental risk in the management of oily sludge is related to the presence of hydrocarbons and various methods have been proposed for analyzing these compounds. Considering the variety of contaminants and existence of difficult biodegradable compounds, this study is aimed to investigate the conventional analyses for measuring contaminants in the oily samples which contain compounds with high molecular weight. In the present work, gravimetric and GC-FID standard methods were employed to examine the destruction rate of oily hydrocarbons as the result of ozonation process. Results showed that advanced methods could not detect compounds with high molecular weight in the conventional conditions; but they can be employed to determine the fractions of hydrocarbons after the treatment process. In this work, gravimetric method was a more precise analysis than GC- FID for the case of oily sludge samples.

Keywords: Oily sludge, Gravimetric method, Ozonation, GC-FID

Studying removal of PHCs from Deposits of Petroleum Storage Tanks by Ozonation Method: Determining Optimal Conditions by Central Composite Design Method

Mahdi Farzadkia[1, 2], Majid Kermani [1, 2], Ali Esarfili[1, 2], Mahdi Ghorbanian[3], Niloufar Borhani Yazdi[4], Ehsan Abouee Mehrizi[4]

[1] Research Center for Environmental Health Technology, Iran university of Medical Sciences, Tehran, Iran.
[2] Department of Environmental Health engineering, School of Public Health, Iran university of Medical Sciences, Tehran, Iran.
[3] Department of Environmental Health engineering, School of Public Health, North Khorasan University of Medical Sciences, bojnurd, Iran.
[4] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd,Iran.

***Corresponding author:** Email: ehsan.abouee@gmail.com Tel number: 09120203237

Abstract

Background: The increasing trend of petroleum production in Iran and lack of proper and systematic management of waste products in the deposition of petroleum storage tanks have made the existing hydrocarbons cause great hazards for the environment. In this research, the ozonation process was used to manage these petroleum deposits.

Method: In this experimental study, effects of pH, ozone dose, and TPH concentration were evaluated. In order to measure the petroleum hydrocarbons, initially and using the n-pentanes, the hydrocarbons were extracted from the environment followed by detection using the GC-FID. The response surface methodology was used to evaluate the effect of independent variables on response function.

Findings: In this research, efficiency was calculated as 45.47 % in the optimal conditions of removing TPH with respect to the optimal energy consumption for the process. Analysis of variance and regression showed that the fitted model had good agreement with the laboratory results.

Conclusion: Results demonstrated that the advanced oxidation process of ozone at high pHs could be a useful method for the degradation and reduction of heavy hydrocarbons in petroleum waste. However, regarding the energy consumption, it is suggested to use less costly reactions as pretreatment or final treatment steps.

Keywords: GC-FID, Advanced Chemical Oxidation, Petroleum Deposits

Removal of phenol from aqueous solutions by activated carbon prepared from Haloxylon tree waste

Mohammad Bagher Miranzadeh[1], Hamid Safari[1], Hossein Akbari[2], Nafiseh Sharifi[1], Ali Atamaleki[3], Ashraf Mazaheri Tehrani[4]

[1] Department of Environment Health Engineering, School of Public Health, Kashan University of Medical Sciences, Kashan, Iran
[2] Department of Biostatistics, School of Public Health, Kashan University of Medical Sciences, Kashan, Iran
[3] Department of Environment Health Engineering, School of Public Health , Shahid Beheshti University of Medical Sciences, Tehran, Iran
[4] Department of Environment Health Engineering, School of Public Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, Iran

***Corresponding author:** Ashraf Mazaheri Tehrani, Email: mazaheri452@gmail.com
Department of Environmental Health Engineering, Faculty of Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Shahid Fahmideh St., Hamadan Postal Code: 6517838736, Iran.

Abstract

This study was conducted to evaluate the adsorption capacity of Nano-activated carbon prepared from Haloxylon tree waste (HTAC) to adsorption of phenol from aqueous solution. Carbonaceous adsorbents produced from Haloxylon tree were made through chemical activation method using H2SO4 as an activator reagent. The effects of variables such as initial pH, contact time, the initial concentration of phenol and adsorbent dose on the removal efficiency were investigated. The results showed that the maximum removal efficiency occurred at pH 7. Therefore, for 95.3% removal efficiency the optimum condition was pH of 7, initial phenol concentration of 50 mg L-1, 2gr L-1 adsorbent dose and contact time of 60 minutes. The adsorption of phenol on HTAC was consistent with Langmuir isotherm and pseudo-second-order kinetics. Monolayer adsorption capacity (qmax) of HTAC obtained to be 4.357 mg gr-1.

Keywords: Activated carbon, Adsorption, Haloxylon, Phenol

Evaluation of Electrocoagulation Process for Removal of Heavy Metals from Plating Industry Wastewater

Maryam Dolatabadi [1*], Saeid Ahmadzadeh [2,3*]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Pharmaceutics Research Center, Institute of Neuropharmacology, Kerman University of Medical Sciences, Kerman, Iran.
[3] Pharmaceutical Sciences and Cosmetic Products Research Center, Kerman University of Medical Sciences, Kerman, Iran.

***Corresponding author:** Health.dolatabadi@gmail.com and chem_Ahmadzadeh@yahoo.com

Abstract

Industrial wastewater discharge is one of major threats to the sustainability of aquatic environment. Heavy metals make up one of the most important pollutants in industrial wastewater. It is known that wastewater produced by the metal-plating industry contains several heavy metals, which are acidic in nature and therefore toxic for the environment and for living creatures. In particular, heavy metals enter the food chain and accumulate in vital organs and cause serious illness. In this study, the removal of heavy metals from plating wastewaters using *electrocoagulation* was investigated.*The obtained results revealed that electrocoagulation (EC) process was able to eliminate* heavy metals *effectively. The amount of pH 9.0, reaction time 40 min, current density 6.4 mA.cm^{-2} and electrolyte type KCl were optimized for successful removal.* Statistical tests (ANOVA and regression) showed that the designed model was in satisfactory agreement with the obtained experimental results.

Keywords: Electrocoagulation process, Removal, Heavy metals, Plating industry, Wastewater.

A Review of Microplastics Measuring Methods in Aquatic Environments

Hamze sharifi[1], Hossein Movahedian Attar[2*]

[1] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran. hamzesharifi95@gmail.com
[2] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran. movahedian@hlth.mui.ac.ir

***Corresponding author:** Hamze sharifi

Abstract

Definition of the problem: Today, despite the widespread use of plastic materials in human life, the use of these materials has created many problems for humans, animals, and the environment. Microplastics have been found in the aquatic and terrestrial environments, food, air, and even human and animal bodies. These particles by absorbing other pollutants and microorganisms on their surfaces transport them and pose a threat to the human, animal, and environmental health.

Aim of Study: Due to the importance of the subject of microplastics and also the lack of knowledge in this field, measuring and evaluating them can lead to more knowledge and understanding of their potentially harmful effects. This study aims to investigate various methods of measuring microplastics in aquatic environments and to compare related studies.

Methodology: This study was conducted in the winter of 2020, by searching the databases of PubMed, Google Scholar, Web of Science, and Scopus and selecting articles related to the measuring of microplastics that were published in reputable journals from 2015 to 2021 and comparing and reviewing them.

Results: In recent years, extensive efforts have been made to identify and measure microplastics around the world, and valuable results have been achieved. However, so far no standard methods for sampling and quantitative and qualitative analysis of microplastics have been published by WHO, ISO, APHA, AWWA, WEF, etc. The main stages of measuring microplastics in various studies include sampling and sieving, pretreatment and digestion, density separation, counting, and Identification of microplastics by their chemical composition.

Conclusion: Because the methods of sampling, extraction, counting, and identification of microplastics have been varied in studies, it is difficult to compare the results related to their concentration, type, size, and measurement methods and it seems that efforts should be made to standardize microplastics measuring methods.

Keywords: Microplastic, Water, Wastewater, Marine, surface-water

Emerging New Methods and Technologies to Control, Reduce, and Eliminate Environmental Pollutants

Mina sheikh [*1], Aryan salavati [2], Maedeh Aghaie [3], Soheil Nohekhan mashhadi [4]

[1] B.Sc. Student, Department of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan,Iran.
[2] M.Sc. Student, Reclamation of Arid and Mountaiouns Regions Department, Faculty of Natural Resources, University of Tehran ,karaj, Iran.
[3] B.Sc. Student, Departmnt of Occupational Health and Safty Engineering, Faculty of Health, Isfahan University of Medical Sciences Isfahan, Iran.
[4] B.Sc. Student, Department of Production Engineering and Plant Genetic, Faculty of Agriculture, Mashhad Ferdowsi University, mashhad, Iran.

Abstract

Background and Purpose: Problems caused by environmental pollution have become an important issue. Environmental pollution, which is mainly caused by toxic compounds, includes water, air, and soil pollution. In general, pollutants enter the body of organisms through food, respiration, skin contact, and plants and are absorbed into the bloodstream, directly and indirectly affecting the physiological function of the human body and disrupting the stability of natural and agricultural ecosystems. Therefore, humans, we need a variety of methods, technologies and technologies that are able to monitor, identify and, if possible, remove contaminants from water, air and soil. In this study, an attempt is made to provide an organized review of studies conducted in Iran and other countries, an analysis of existing methods and technologies, in order to examine more appropriate solutions in future studies, if necessary**.**

Materials and Methods: In this study, all articles in domestic and foreign databases such as SID, Google Scholar, PubMed, Scopus, ISI, and Elsevier were reviewed. The keywords environment, pollution, pollutants, new technology, control, and reduction were used to search. A total of 508 articles were found, which were limited to 173 articles after monitoring and reviewing titles and abstracts

Results: A review of studies in the field of technologies for controlling, reducing and eliminating environmental pollutants showed that adsorption technology, nanofiltration and zero-valent iron nanoparticles are the most effective in reducing and controlling pollutants in water resources. Also, nanotechnology, scrubbers, non-thermal plasmas, and electrostatic precipitators are effective in reducing and controlling air pollutants and are effective for soil pollution of phytoremediation, nanoparticles, iron, and nanoclay and can remove very large amounts of heavy metals and heavy metals**.**

Conclusion: The results showed that the amount of pollutants entering the environment is increasing day by day. Therefore, it is necessary to take management measures to prevent the entry of these compounds into the environment and in case of contamination of resources using new and efficient methods and technologies to control and delete it. In addition, water, air, and soil resources must be monitored continuously.

Keywords: New technology, Environment, Pollutants, Pollution, Control and reduction

Evaluation of Phytoremediation Potential of the Green Microalga *Chlorella Vulgaris* in Degradation Phenanthrene

Somayeh Asghari [1,*], Ali Movafeghi [2], Seyed Yahya Salehi Lisar [2] Mohammad Ali Zazouli [1]

[1] Department of Environmental Health Engineering, Faculty of Health, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran; som.asghari28@yahoo.com
[2] Department of Plant Biology, Faculty of Natural Sciences, University of Tabriz, Tabriz, Iran; movafeghi@tabrizu.ac.ir
[2] Department of Plant Biology, Faculty of Natural Sciences, University of Tabriz, Tabriz, Iran; y_salehi@tabrizu.ac.ir
[1] Department of Environmental Health Engineering, Faculty of Health, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran; zazoli49@yahoo.com

***Corresponding author:** Somayeh Asghari

Abstract

Background and Objective: The distribution of polycyclic aromatic hydrocarbons (PAHs) as a group of toxic and persistent aromatic pollutants in the environment is rapidly enhancing. These compounds have adverse impacts on the health of living organisms. It is necessary to find an effective and eco-friendly method for the elimination of PAHs from the ecosystems. Hence, the present study has been focused on potential of the green microalga *Chlorella vulgaris* for degradation of phenanthrene as a toxic 3-ring PAHs.

Method: The impact of the phenanthrene on *Chlorella vulgaris* cells was evaluated by protein assay and GC–MS analysis. Four different concentrations (2, 10, 25, and 50 mg L^{-1}) of phenanthrene were selected for the study. The experiments were performed in 250-mL Erlenmeyer flasks, each including 100 mL alga culture media and repeated 3 times for control and treated algal samples with 2, 10, 25, and 50 mg L^{-1} of phenanthrene for 7 days.

Results: The total protein content was not significantly altered by 2 mg L^{-1} phenanthrene treatments in comparison to the control after 7 days exposure, whereas the total protein content exposed to the 10, 25, and 50 mg L^{-1} phenanthrene showed remarkable decrease 23, 28 and 35%, respectively ($P < 0.05$). Furthermore, GC/MS technique explained the biological degradation of phenanthrene in the present research and accordingly, a number of intermediate by-products were identified.

Conclusions: The obtained results confirmed that *Chlorella vulgaris* has noticeable potential in biodegradation of phenanthrene.

Keywords: Biodegradation, *Chlorella vulgaris*, Phenanthrene

Humic Acid Removal from Aqueous Solutions using Ultraviolet Irradiation, Hydrogen Peroxide and Zinc Oxide Nanoparticles

Vahide Oskoei [1,*]

[1] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.

***Corresponding author:** oskoei.v@gmail.com

Abstract

Aim of the study: individual efficiency of ultraviolet irradiation (UV), zinc oxide nanoparticles (ZnO) and hydrogen peroxide (H_2O_2) processes, as well as a performance of combined processes of UV/H_2O_2 and UV/H_2O_2/ZnO, were assessed for the removal of humic acid **(**HA) from aqueous solutions.

Methodology: Various process-related factors, such as the concentration of ZnO (0.2 and 0.5 g/L), the concentration of H_2O_2 (20, 30 and 50 mg/L), UV = 125 W, pH (4, 7, and 10), initial HA concentrations (at wavelength of 254 nm) of 2, 5, 7, and 10 mg/L, and three types of interferences (nitrate, sulfate, and chloride) were studied and optimized.

Results: The results showed that the removal efficiency decreased by increasing the concentration of HA and pH values in all processes, but it increased by increasing the time of exposure and concentration of H_2O_2. In the combined process of UV/ZnO/H_2O_2, the nanoparticle concentration of 0.2 g/L yielded the highest efficiency, whereas in the other processes, the highest efficiency was observed at nanoparticle concentration of 0.5 g/L. Based on these results, under the optimum conditions (HA = 2 mg/L, H_2O_2 = 50 mg/L, ZnO = 0.2 g/L, pH = 4.0, and contact time of 15 min), UV/ZnO/H_2O_2 process was found as the most efficient combination in removing of HA with an efficiency of 99.99%. The modeling results indicated that the adsorption reaction of HA onto ZnO nanoparticles was very well described by the pseudo-second order kinetic model (R^2 > 0.99).

Conclusion: therefore, this inquiry is in progress using H_2O_2/ZnO combined with UV to remove HA from aqueous solutions.

Keywords: Ultraviolet irradiation; Zinc oxide nanoparticles; Hydrogen peroxide; Humic acid

Entrepreneurship and Commercialization of Services in Environmental Health

Posters

Establishment of a Regulatory Body in the Field of Waste and Recycled Waste Exchanges

Abdollah Ghavami

Technical and Executive Deputy of Sanandaj Municipality Waste Management Organization
ghavami1354@yahoo.com

Abstract

its advantages include: creating a database for all legal actors and in order to improve the affairs and address the concerns of private waste service activists in the recycling industry and municipalities to identify segregation contractors from the source and recycling industries of various types of waste, eliminate brokers and traders and prevent excessive increase in the purchase price of dry waste. A new and innovative solution for the first time in the country to organize the current situation of purchase, sale, transfer and recycling of such materials by implementing the plan to set up a regulatory body for "issuing a bill of lading for dry waste transportation by municipal waste management organizations" "Prepared and presented.practitioners in the field of waste segregation and recycling in the country, creating a comprehensive database of dry waste generation by type at the local, provincial and national levels, creating a website of daily prices Waste such as gold and coin price site, supply of goods or recycled materials in the stock market, implementation of Article 5 of the law and Articles 16 and 32 of the executive regulations of the law of waste management, etc. directly and organizing the collection and purchase and sale of waste, construction The town will be recycled and ... indirectly. Prohibiting the traffic of trucks transporting recyclable dry waste without having a bill of lading issued by municipal waste management organizations in the country's transportation hubs to organize the current situation and deliver this type of goods to legal and competent natural persons and make the space unsafe for individuals. The violator, with the cooperation and supervision of the Iranian Recycling Industries Union, will be the traffic police by issuing a bill of lading.

Key words: Dry waste, Bill of lading, Law, Recycling

Investigating the Possibility of Startup Activities and Business Models in the Field of Recycling, Sale and Reuse of Waste in Iran

Abdollah Ghavami

Technical and Executive Deputy of Sanandaj Municipality Waste Management Organization
ghavami1354@yahoo.com

Abstract

One of the most important issues resulting from changes in today's societies is the production of different types of solid waste in different quantities and qualities. The basic and appropriate solution to solve the problems caused by such materials is the use of new management systems along with new and advanced technology. The recycling and reuse industry has always been money-generating and employment-generating, and developed countries are aware of this issue and look at disposable waste economically and seek to earn money from it. According to the available information, the average waste recycling in Iran is only 20% (developed countries 70%), so it can be said that the necessary potential and platform for reaching innovative ideas of young people and university graduates in Iran has been provided. Now with the growth of a relatively new paradigm of wealth creation due to the growing challenges of the country in areas such as social, economic, waste management, environment, pollution, the entry of entrepreneurs and startup companies in these areas can be supported by comprehensive Government and creating the necessary conditions for community participation will have more effects on the economy and employment, and in addition, will help solve the social and national problems of waste.

Key words: Startup, Business, Waste, Recycling and reuse

Investigating Creativity, Entrepreneurship, and Commercialization in Waste Management

Alireza Rahmani [1], Shiva Ghiasvand [2*], Mohammadhasan Kwosari [3], Mahmood Yousefi [4], Reza Jamshidi [5]

[1] Department of Environmental Health Engineering School of Health. Hamadan University of Medical Science. Hamadan, Iran.
[2] PhD Student in Environmental Health Engineering, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.
[3] MSc Student of Environmental Health Engineering, Student Research Committee, Sabzevar University of Medical
Sciences, Sabzevar, Iran.
[4] PhD Student in Environmental Health Engineering, Faculty of Health, Iran University of Medical Sciences and Health Services, Tehran, Iran.
[5] Msc student of Environmental Health Engineering. School of Health. Hamadan university of Medical Science. Hamadan. Iran.

***Corresponding author:** Shiva Ghiasvand

Abstract

Objective: Principled entrepreneurship is the result of establishing the right connection between innovation and commercialization of a product or idea. In fact, the basis of entrepreneurship is the right idea generation and innovation in order to solve existing problems that can commercialize the output product, to market it. Entrepreneurship, in addition to creating jobs, leads to the development of new technologies, encourages investment in new sectors and provides solutions to existing problems that have so far been solved by purchasing science from foreign countries. Therefore, the present study was conducted with the aim of investigating creativity, entrepreneurship and commercialization in waste management as one of the subsets of the field of environmental health engineering.

Results: The present study is a perspective study. Graduates of Environmental Health Engineering can pursue creativity, entrepreneurship, and commercialization of their product and idea according to the courses learned in the field of waste management at any stage. In this study, several general cases of creativity, entrepreneurship, and commercialization in the field of waste management are mentioned to make the graduates of this field more familiar. Thus, creativity, entrepreneurship and commercialization in the fields of material recycling and compost, waste collection contractors, recycling of plastics, waste rubber, construction and demolition, recycling and reuse of waste oils, agricultural waste and waste Wooden was discussed.

Conclusion: Entrepreneurship capability of environmental health engineering graduates in the field of waste management has a high potential that achieving it requires principled cooperation between universities, industries, investors, research and technology organizations and ultimately the acquisition of skills and knowledge and effort of the entrepreneur himself.

Keywords: Creativity, Entrepreneurship, Environmental Health, Waste, Job creation

Employment Opportunities in Environmental Health Engineering

Mohammad Taghi Ghaneian [1], Maryam Gholami [2*]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Email address: mtghaneian@gmail.com
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Email address:gholami313114@gmail.com

***Corresponding author:** Maryam gholami

Abstract

Introduction: The field of environmental health engineering has a wide range of specialized courses and students pass courses related to water, wastewater, air pollution, waste, etc. These courses can be used in various sectors of industry and society. Therefore, in this article, job opportunities and businesses related to the courses of students of environmental health engineering and related fields have been introduced.

Methods: This article has been written as a review by using valid scientific sources, including educational programs approved by the Ministry of Health for the field of environmental health engineering and related fields, scientific books as well as information of companies and institutions related to the fields of activity of these fields.

Results: Graduates of Environmental Health Engineering and related fields can work in departments of the Ministry of Energy (departments related to quality and quantity control of water resources, water resources development, maintenance of water quality, etc.), municipal and rural water, and wastewater companies. municipalities (waste management, waste recycling, compost, etc.), education (school health), health, safety and environment unit of the Ministry of Petroleum and all affiliated institutions and most industries and mines, environmental monitoring laboratories, Hospitals and medical centers, etc. In addition to the above, due to the wide range of specialized courses in this field, graduates, based on the approach of bamaHSE can work duo to specialized courses, in private and knowledge-based companies in at least 40 related subgroups such as Water and Wastewater Consulting Engineers, Water and Wastewater Supply Companies, Air Pollution Consulting Engineers, Air Pollution Laboratories, Waste Disposal and Decontamination Supply Companies, Waste Processing and Recycling, Emergency and Environmental Supply Companies, Environmental and Health Impact Assessment Companies, etc.

Conclusion: Due to the wide range of specialized courses in environmental health engineering and related fields, graduates of these fields can have suitable job opportunities in accordance with these topics, especially in private and knowledge-based companies.

Keywords: Environmental Health Engineering, Job Opportunities

An Assessment of Radiographers' Technical and Protective Performance in Saravan Hospitals

Fatemeh Zakieh Tohidi [1,*], Hadi Nakhzari Moghadam [1]

[1] Medical Physics Department, Faculty of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran.

***Corresponding author:** Fatemeh Zakieh Tohidi

Abstract

Background: Notwithstanding the benefits of radiography, the staff of radiography wards must take necessary care to minimize their own and patients' exposure to harmful rays. Therefore, the present paper aimed at assessing the radiolographers' awareness and performance concerning technical and protective principles.

Methods: In this descriptive-analytical study, all the 35 radiolographers working in the radiology wards of Saravan hospitals. In order to collect data about their performance, a checklist whose reliability and validity had been approved was provided. For the radiography staff 17 technical and 12 protective items during three work shifts were checked and recorded. The obtained data was statistically analyzed by means of SPSS.

Results: A total of 35 personnel in the study were 18 male (51.43%), 16 female (48.57%) Their performance score was assessed. The results of five factors of radiology staff including gender, employment status, age, work experience, and education were not significant.

Conclusions: The radiographers' awareness of technical and protective principles was at medium level. However, both quality academic training and in-service education seem necessary.

Keywords: Radiographs; Radiation protection; Radiography techniques

The Role of Environmental Health in Epidemics Prevention and Control (with emphasis on COVID-19)

Presentations

Detection of Antibiotic Resistance Genes in *Escherichia coli* Isolated from Municipal Wastewater Treatment Plants Effluent

Zahra Shamsizadeh[* 1], Mohammad Hassan Ehrampoush[2], Mahnaz Nikaeen[3], Mehdi Mokhtari[4], Mahsa Rahimi[5], Hossein Khanahmad[6], Farzaneh mohammadi[7]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Email address (z_shamsizadeh69@yahoo.com)
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Email address (ehrampoush@ssu.ac.ir)
[3] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; Email address (nikaeen@hlth.mui.ac.ir)
[4] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Email address (mhimokhtari@gmail.com)
[5] Department of Genetics and Molecular Biology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran; Email address (M.rahimi1822@gmail.com)
[6] Department of Genetics and Molecular Biology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran; Email address (hossein_khanahmad@yahoo.com)
[7] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; Email address (fm_1363@yahoo.com)

***Corresponding author:** Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Email address (z_shamsizadeh69@yahoo.com)

Abstract

In recent years, water security has led to receiving much attention to the reuse of wastewater. However, municipal wastewater has a high potential for the dissemination of bacteria and antibiotic resistance genes (ARGs) into the environment. The release of these bacteria and genes into the environment has raised concerns about public health. Antibiotic resistance in the environment can be transmitted from pathogenic bacteria to non-pathogenic bacteria, putting pressure on aquatic ecology and its microbial population. In this study, *Escherichia coli* isolates were isolated from effluent from wastewater treatment plants as an indicator bacterium. The presence of ARGs including *cml*-A, *blaCTX*-m-32, *blaOXA*-23, *tet*-W, *sul*1, and *erm*-B in *E. coli* isolates was investigated by PCR. Among the studied ARGs, the highest detection rate was 38.7% and was related to *sul*1. *BlaCTX*-m-32 and *erm*-B were detected in 14.5% and 12.9% of isolates, respectively. The results of this study show that the entry of wastewater treatment plants effluent into the environment can lead to the dissemination of antibiotic resistant bacteria and ARGs into the environment and pose a threat to public health.

Keywords: Wastewater, Antibiotic resistance, *Escherichia coli*

Environmental Contamination and Exposure Risk of SARS-CoV-2 in the healthcare workers of hospitals in Qom, Iran

S Shams [1], R Aali [2], M Safa [2], Z Atafar, MGhanbary [3], Y Ghafuri [2*]

[1] Cellular and Molecular Research Center, Qom University of Medical Sciences, Qom, Iran
[2] Research Center for Environmental Pollutants, Qom University of Medical Sciences, Qom, Iran
[3] Social Development & Health Promotion Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran
[4] Health and Environment Research Center, Tabriz university of Medical Sciences, Tabriz, Iran

**** Corresponding author.*** Tel**:** +982532852740 E-mail: yadollahghafuri@yahoo.com
Saeed.Shams, E-mail:sshamsmed@gmail.com
Rahim.Aali, E-mail: aali1400@gmail.com
Mehdi.Safa, E-mail: Mehdisafa8585@gmil.com
Zahra.Atafar, E-mail: zahra_atafar@yahoo.com
Mohammad.Ghanbar, E-mail: ghanbarym@yahoo.com
Yadollah. Ghafuri, E-mail:yadollahghafuri@yahoo.com

Abstract

COVID-19 is a new infection that first occurred in China and now is spreading worldwide. The disease is considered to be a serious respiratory disease in humans. This study has been designed to assess surface contamination of SARS-CoV-2and exposure risk of the disease in the medical staff of two coronavirus referral hospitals of Qom province, which were dedicated to the admission and treatment of COVID -19 patients.. This study was carried in two steps including analysis of environmental samples and exposure risk assessment of COVID-19. In this study 50 environmental samples were collected from different sites of the hospitals. After extracting RNA, RT-PCR was done for the detection of SARS-CoV-2. The results showed that 18% of environmental sites, including elevator buttons (8%), doorknobs (6%) and bed rails (4%) were positive. In the risk assessment process based on according to wear of personal protective equipment, exposed to high touch surfaces, performing hand hygiene, any accident with biological fluid/respiratory secretions, the results indicate that 60.4 %, 68.3%, 28.6% and 20.6% health care personal including medical doctors, nurses and assistant nurses have high risk, respectively. In general, implement a plan for monitoring health personnel exposed to confirmed COVID-19 cases for respiratory illness including environmental surveillance engineering controls and personal protective equipment recommended.

Keywords: COVID-19; Environment; Risk; Exposure; Hospitals

A Systematic Review of COVID-19 (SARS-CoV-2) Pandemic: Focus on Environmental Survival and Possible Airborne Transmission

Zahra Noorimotlagh [1], Seyyed Abbas Mirzaee [1*], Neemat Jaafarzadeh [2,*]

[1] Department of Environmental Health Engineering, Faculty of Health, Ilam University of Medical Sciences, Ilam, Iran. Email: noorimotlagh.zahra@gmail.com, mirzaee.seyyed@gmail.com
[2] Environmental Technologies Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Email: n.jaafarzade@yahoo.com

***Corresponding author:** Seyyed Abbas Mirzaee

Abstract

Recently, an outbreak of a novel human coronavirus which is referred to as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) (COVID-19) by the World Health Organization (WHO) was identified in Wuhan, China. The rapid spread of the COVID-19 (SARS-CoV-2) disease and, subsequently, deaths around the world, lead to the declaration of the pandemic situation in the world. At the beginning of the pandemic, much attention is paid to person-to-person transmission, disinfection of virus-contaminated surfaces, and social distancing. However, there is much debate about the routes of disease transmission, including airborne transmission, so it is important to elucidate the exact route of transmission of the COVID-19 disease. To help combat the pandemic, systematic review (SR) study was conducted to comprehensively search all databases to collect studies on environmental survival and airborne transmission of SARS-CoV-2 in indoor air environments. The findings indicated that SARS-CoV-1 and SARS-CoV-2 can survive under different environmental conditions between 4-72 h approximately. The results also demonstrate that temperature and relative humidity are important factors in the survival of SARS-CoV-2. It is important to note that the more studies require addressing the possible airborne transmission due to the survival of SARS-CoV-2 in aerosols for 3 h, approximately. In total, 14 relevant and eligible studies for airborne transmission were included. Based on the findings, there is a great possibility of airborne transmission of SARS-CoV-2 in indoor air environments. Therefore, some procedures are presented such as improving ventilation, especially in hospitals and crowded places, and observing the interpersonal distance of more than 2 meters so that experts in indoor air quality consider them to improve the indoor air environments. Finally, in addition to the recommendations of the centers and official authorities such as hand washing and observing social distancing, the route of air transmission should also be considered to further protect health personnel, patients in hospitals, and the public in other Public Buildings.

Keywords: SARS-CoV-2, COVID-19, Environmental Survival, Airborne transmission, Indoor air

The Role of Environmental Health in Epidemics Prevention and Control (with emphasis on COVID-19)

Posters

Investigation of drinking water in Abdanan city in terms of residual chlorine and bacterial quality in a period time of 1397- 1392, focusing on earthquake phenomenon

Ali Nikounahad, Mehdi lorestani

Water is one of the most important materials needed by living organisms and it is not possible to improve the health of the community without access to safe drinking water. On the other hand, unhealthy water leads to the spread of waterborne diseases. Chlorination is a simple, easy, low-risk and very effective method in eliminating pathogenic microorganisms from water; Therefore, in this study, the relationship between chlorination, bacterial quality of urban and rural drinking water in Abdanan Township and earthquake phenomenon in the years 1392 to 1397 was investigated. Data and information related to chlorination and microbial tests of urban and rural water in the period 1392-1397 were collected from the water laboratory of Abdanan health network and then divided into two categories: urban and rural by year. The results of the present study were analyzed using Excel software (2010 version). In addition, Pearson correlation coefficient was used to investigate the relationship between the occurrence of multiple earthquakes and water pollution. Results of the present study showed that the highest amount of desirable cases of urban residual chlorine (99.5%) in 1394 and 1395 and the lowest amount (96.5%) in 1392. The best situation of desirable cases of residual chlorine in rural areas. (98.9%) is related to the years 1392 and 1395, Also, the best urban microbial quality status is related to 1392, 1394 and 1397. And the best rural microbial quality status is related to 1392, while the worst bacterial water status in both urban and rural areas was related to 1393. Also, the correlation coefficient between the occurrence of the earthquake and the unfavorable bacterial results was 0.62. Data analysis shows that approximately 98.7% of urban chlorination tests and 95.8% of rural chlorination tests were desirable. Also 98.6% of urban microbial tests and 98.7% of rural microbial tests were desirable. The decrease in water quality in terms of microbial pollution in 1393 is probably due to several earthquakes this year. In general, this study showed that the microbial quality of drinking water in Abdanan Township is more desirable than the microbial quality of water in other parts of the Iran.

Keyword: Residual chlorine, bacterial quality of drinking water, earthquake

Investigating the Reasons of High Prevalence of Covid-19 Disease in Prisons and Penitentiaries from a Health Perspective and Providing Corrective Solutions

Samaneh Dehghan[1], Fatemeh Mortezazadeh*[2]

[1] Assistant professor, Department of Environmental Health Engineering, School of Public Health, Mazandaran University of Medical Sciences, Sari, Iran, E-mail: sdehghan2010@gmail.com
[2] MSc Student, Department of Environmental Health Engineering, School of Public Health, Mazandaran University of Medical Sciences, Sari, Iran, E-mail: fmortezazade0098@gmail.com

***Corresponding author:** Fatemeh Mortezazadeh, MSc Student, Department of Environmental Health Engineering, School of Public Health, Mazandaran University of Medical Sciences, Sari, Iran.
E-mail: fmortezazade0098@gmail.com

Abstract

The aim of study: With the advent of the coronavirus Covid-19, the lives and health of millions of people have been threatened. One of the important centers that received less attention during the Covid-19 epidemic is prisons and penitentiaries, which are a good environment for the Covid-19 outbreak. Prisoners are at greater risk for Covid-19 disease due to overcrowding. In addition, due to the prevalence of other infectious diseases, these places have limited access to health services to the community and its low potential for protection measures are considered high-risk environments for the outbreak of Covid-19.

Methodology: The present study was conducted as a narrative review and searched all of the published articles related to the subject using Covid-19, Prevalence, Prison, Hygiene, and Personal hygiene keywords from Science Direct, Scopus, Web of Science, PubMed and Google scholar databases until November 2020. In the present article, the reasons for the high prevalence of Covid-19 disease in prisoners are examined from a health perspective and corrective strategies to improve the existing conditions are presented.

Results and conclusion: The results of this study showed that lack of adequate facilities for hand washing and personal protective equipment, overcrowding, lack of rooms for quarantine of patients and suspect prisoners, lack of physical distancing along with poor ventilation, increased transmission of infectious diseases such as Covid-19 in prisons and penitentiaries. Accordingly, it is recommended to improve the personal hygiene conditions in prisons by taking measures such as preparing liquid soap, disposable wipes, disinfectants and distributing disposable masks to prisoners and staff, and guidance on the proper use of the mask. In addition, it is necessary to disinfect the surfaces of common utensils and equipment between prisoners, such as public table surfaces, sinks, door handles, and, to reduce gatherings, if possible. Despite the importance of all these measures, the most effective way to prevent the spread of the disease in prisons and penitentiaries is to reduce the prison population, which the criminal justice system can do this by reducing unnecessary admission of prisoners and expediting their release.

Keywords: Covid-19, Prevalence, Prison, Penitentiary, Personal health

Investigating the Changes in Household Waste Production Pattern before and after COVID-19 Outbreak in Mazandaran Province in 2020

Seyedeh Fatemeh Mousavi [1], Fathollah Gholami-Borujeni [2]*

[1] Master student of Environmental Health Engineering, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran.
[2] Department of Environmental Health, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran

***Corresponding author:** Fathollah Gholami-Borujeni - Faculty of Health, Mazandaran University of Medical Sciences Sari, Iran (E-mail: gholami_b_f@yahoo.com)

Abstract

Background and purpose: Lifestyle and standard of living, consumption of goods, services, and economy are the most important factors in the amount of household waste production. In this study, changes in the pattern of household waste production before and after the outbreak of COVID-19 in Mazandaran province have been investigated.

Methods: In this cross-sectional descriptive study, data were collected using an electronic questionnaire with 45 questions, 6 questions (demographic), 13 questions (amount of waste generated before and after the COVID-19 outbreak), and 19 questions (With changes in household waste before and after the COVID-19 outbreak), 2 questions (number of purchases), 2 questions (the number of waste disposal before and after the COVID-19 outbreak) were collected. To evaluate the reliability of the questionnaire, the Test-Retest test and Cronbach's alpha coefficient were used.

Results: The results of the study showed that there was a significant difference between the living environment and production waste before and after the corona outbreak. There was no significant difference between the amount of waste generated before and after the corona outbreak among households and the volume of purchase (p-value <0.05), one-way analysis of ANOVA showed changes in the pattern of household waste production before and after the corona outbreak between outs No significant difference was observed between the parameters of sex, level of education, and occupation of the participants in the survey before and after quarantine. In addition, the studied parameters for the volume of waste generated before and after quarantine were not significantly different. Also, the results of examining the relationship between consumer price index in September and March 2020 and the amount of production waste show that there is a significant relationship.

Conclusion: The results of studies in different countries showed that during the corona outbreak, the amount of household waste production increased between 20 to 80%, but in the study province, the results showed no significant difference in the amount of household waste production after the outbreak. This can be due to the effects of inflation and the consumer price index in food, which is the largest part of household waste, in this period.

Keywords: Household Waste Production Pattern, Quarantine, Covid-19, Mazandaran Province

The Persistence of the New Corona Virus on Surfaces

Hadi Alimoradi [1], Mahsa Nazari [2], Alireza Ajdani [3], Reza Jafari Nodooshan [4]

[1] Master of Occupational Health Engineering, Occupational Health Research Center, School of Public health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Master of Occupational Health Engineering, Occupational Health Research Center, School of Public health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[3] Doctor of Medicine, Isfahan University of Medical Sciences
[4]. Assistant Professor and Faculty of Occupational Health Engineering, Department of Occupational Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

***Corresponding author:** nazarimahsa95@yahoo.com

Abstract

Under controlled laboratory conditions, inactivation of the airborne pathogenic virus was examined in the new coronavirus respiratory syndrome. Two experiments with weather conditions were performed in these experiments; 1. The first test shows the typical environmental conditions of the office (25 ° C and relative humidity 79%), 2. Climatic conditions in the Middle East where the virus originated (38 ° C and Relative humidity 24%). At lower temperatures, the virus showed high potency and survival, meaning that 63.5% of the microorganisms were still pathogenic 60 minutes after the aerosol was made. Fortunately, the probability of the virus disappearing in hot, dry weather was much higher with a survival rate of only 4.7% over 60 minutes.

Keywords: Bioactive, Virus, Coronavirus, Aerosol, Surfaces

The role of Environmental Health in Controlling and Preventing Epidemics with Emphasis on Corona

Reza Dehghan [1]*, Iman Teimouri Hafizabadi [2]

[1] Environmental Engineering M.Sc. Islamic Azad University of Research Sciences. Faculty of Engineering, Tehran, Iran.
Kamyar_639@yahoo.co.uk
[2] Graduate, Environmental Health Engineering, Bachelor of Birjand Azad University, Birjand, Iran.
imanth.1994m@gamil.com

***Corresponding author:** Reza Dehghan, Email:Kamyar_639@yahoo.co.uk

Abstract

Until now, no drugs or vaccines are available to combat *COVID-19* infection, and the rate of infection is rising sharply worldwide. The WHO has only recommended preventive measures and a healthy lifestyle with an effective immune system to fight and stay safe from *COVID-19*. The WHO recommends alcohol-based disinfectants for frequent hand hygiene, which are mainly made from ethanol, isopropyl alcohols, and hydrogen peroxides in various compounds. Excessive use of these substances may be toxic to human health and the environment if misused. These chemicals may have toxic and dangerous effects on the environment when released due to evaporation. In the first five months of 2020, the American Toxic Control Center reported 9504 reports of alcohol disinfection exposure in children under 12, recognizing that even small amounts of alcohol can cause alcohol poisoning in children, causing confusion, vomit, and drowsiness, and respiratory arrest and even death in severe cases. In addition, repeated use of hand sanitizers has increased the risk of antimicrobial resistance and other viral diseases. The present study is designed to highlight the impact of frequent use of hand sanitizers with alcohol-based compounds, and its serious health and toxic hazards to human health and the environment.

Keywords: Hand Disinfectant, COVID-19, Human Health Risks, Human Health

Investigating the Amount of Face Mask Consumption and Medical Waste Production during the Coronavirus Pandemic in Iran; Challenges and Problems

Tooraj Massahi *[1], Sheida Atashkar [2]

[1] Student research committee, School of Public Health, Kermanshah University of Medical Sciences, Kermanshah, Iran; tooraj.massahi@kums.ac.ir
[2] MSc Student of Environmental Health Engineering, School of Public Health and Safety, Shahid Beheshti University of Medical Science, Tehran, Iran: sheidaatashkar@sbmu.ac.ir

***Corresponding author:** Tooraj Massahi

Abstract

Background & objectives: The COVID-19 pandemic has caused a global crisis due to increasing the death rate and enormous challenges in the health, environment, economic, and social sectors. In order to prevent, diagnose and treat this disease, millions of personal protective equipment (mainly made of plastic), including gloves, gowns, face masks and face shields are used, that can generate infectious wastes that are contaminated by Coronavirus. Mismanagement of these wastes can lead to the spread of Coronavirus in developing countries that have poor waste management strategies. A comprehensive plan to improve medical waste management in each country requires awareness of the current state of solid wastes. The aim of this study is to investigate and estimate the consumption rate of face masks and the production rate of medical waste during the Coronavirus pandemic in Iran. Furthermore, the performance of different parts of medical waste management and future challenges are discussed**.**

Methods: The rate of daily face masks used and medical waste production was calculated based on the population data, the percentage of the urban population, Face masks acceptance rate percent, the number of face masks needs per person per day, total COVID-19 confirmed cases and medical waste generation rate(kg/bed/day).

Results: As the results of this study showed the increasing population and the confirmed Coronavirus cases, has led to increase in the number of used face masks and the amount of produced medical wastes, and it has also caused new challenges in medical waste management processes**.**

Conclusion: COVID-19 is a highly contagious and problematic disease, in order to prevent the adverse effects of the vast medical wastes produced on the environment and human societies, appropriate medical waste management programs, standards, guidelines, and strategies should be carefully evaluated and implemented.

Keywords: Infectious waste, Coronavirus, Medical waste, Face mask, Waste management

Environmental Factors affecting the Incidence, Infection, and Mortality due to Covid-19 Disease

Mohammad Ali Zazouli [1], Zabihollah Yousefi [2], Alireza Ala [3]

[1] Professor, Department of Environmental Health Engineering, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran
[2] Professor, Department of Environmental Health Engineering, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran
[3] PhD student in Environmental Health Engineering, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran

***Corresponding author:** Alireza Ala, Email: ala_alireza@yahoo.com

Abstract

Introduction: Environmental factors can play a role in the incidence, infection, and mortality of Covid-19 disease. This study was conducted to investigate and analyze the role of a number of environmental factors that have been studied in the world.

Materials and Methods: This study was conducted by reviewing existing published articles, case studies, and information from official reports and websites. From a large number of studies, this study collects, presents, and meets data and information on environmental factors influencing the incidence, infection, and mortality of COVID-19.

Results: Each of the factors of air pollution, temperature, humidity, water, sewage, and waste can play a role in the incidence, infection, and mortality of Covid-19 disease. Analysis of available data emphasizes the effective role of environmental control in preventing the spread and reduction of infection, infection, and mortality due to Covid-19 disease. Improving environmental performance in the world is one of the best and most effective ways to prevent the spread of the disease, especially in the case of Covid-19 right now.

Conclusion: Ensuring global environmental performance is essential to protecting countries' populations from COVID-19 and protecting the population from other public health hazards. More investment in research and development is needed.

Keywords: Covid-19, Environmental factors, Air pollution, Temperature and humidity, Water and wastewater, Waste

Survey of the Environmental Health Status of the Laundry in Hospitals of Mashhad University of Medical Sciences in 2018

Maryam Paydar [1], Ayda Khakpour [2], Fatemeh Khedmatgozar [2], Mona Tabriziazad[3*]

[1] MSc,Environmental health specialist, Department of Environmental Health Engineering, faculty Health, Mashhad University of Medical Sciences, Mashhad, Iran. Email: Paydarm1@mums.ac.ir
[2] BS, Department of Environmental Health Engineering, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran. Email: Paydarm1@mums.ac.ir
[3] MSc, Department of Environmental Health Engineering, School of Public Health Mashhad, Mashhad, Iran

***Corresponding author:** mona.tabriziazad2017@ gmail.com. Tel: 09337557595

Abstract

Background and Aim: Among the various organizations of a health system, the hospital is considered as one of the most important institutions providing health care, medical treatment and education, with its special facilities for the return of the patients' physical and mental health, training of specialist health professionals, Medical research, and ultimately the upgrading of community health. The laundry room is one of the important parts of the hospital and it is important for the health and spread of the infection. The purpose of this study was to determine the state of health of the laundry room of the hospitals affiliated to Mashhad University of Medical Sciences in 2018.

Material and Methods: This study was a descriptive cross-sectional study in 14 hospitals affiliated with Mashhad University of Medical Sciences. The information and variables related to the condition of the sanitary facilities of the laundry rooms were examined by observing and completing a checklist, which has three sections, including (physical space, equipment, and performance). Data were analyzed using Excel and SPSS software**.**

Results: The analytical results of the study showed that there is no significant relationship between equipment and performance with the type of hospital, type of activity, age, and number of active beds in the hospital ($P>0.05$) while between physical space and type of hospital, type of activity, age, and number Active bed showed a significant correlation ($P<0.05$)

Conclusion: In general, there is no laundry in the 2 hospitals, while 3 Hospitals have an appropriate sanitary laundry and 5 hospitals have relatively good sanitary conditions in the laundries and 4 hospitals have poor sanitary conditions. Therefore, observing the poor sanitary condition of the laundry can cause and spread hospital infections. SO, it is very necessary to try to improve the situation in hospitals.

Keywords: Environmental Health, Hospital, Laundry

Investigation of Coronavirus from the Perspective of Environmental Health

Marzieh Akbari [*1], Fatemeh Hammamian Zavareh [2], Zahra Shouri Bidgoli [2]

[1] Master student of Environmental Health Engineering, Faculty of Health, Kashan University of Medical Sciences, Kashan, Iran.
akbari.2016.mm@gmail.com
[2] Undergraduate student of Environmental Health Engineering, Faculty of Health, Kashan University of Medical Sciences, Kashan, Iran.

Abstract

Background and purpose: Coronavirus has high pathogenicity and transmission and its characteristics are still much unknown. Environmental health professionals play an important role in leading environmental issues, especially at the local level. They are a trusted group of messengers who understand environmental knowledge as well as its effects on health. With the onslaught of corona on the visible and hidden layers of our lives, it is necessary to pay more attention to health. Therefore, the present study was conducted to investigate the corona virus from the perspective of environmental health.

Materials and Methods: This study was conducted as a review using the keywords of environmental health, coronavirus, transmission, epidemic in sites related to reputable journals in scientific databases.

Results: Success in coronavirus requires recognition, investment, and support of the environmental health workforce. Environmental health plays an important role in epidemics such as coronation by performing various tasks. On the other hand, the virus can be transmitted through various routes such as air, surfaces, and sewage, which has an important relationship with the tasks of the environmental health force. It is noteworthy that the virus has had environmental benefits such as reducing greenhouse gases and harmful effects such as increasing infectious waste, more antibiotics entering the sewage, poisoning people with disinfectants.

Conclusion: Proper ventilation, disinfection of public places, observance of social distance, attention to water and waste hygiene, personal hygiene and the use of masks should be considered to prevent the spread of the coronavirus. All the mentioned cases are in the scope of work of the environmental health forces and their continuous efforts are taught and supervised to the members of the community. Paying attention to prevention is a highlight of our story today, a topic in which environmental health experts are skilled. Therefore, the role of environmental health forces as the main lever in preventing the coronavirus epidemic should not be ignored.

Keywords: Environmental health, Coronavirus, Transmission, Epidemic

Qualitative and Quantitative Characteristics of Hospital Wastes of Yasuj Hospitals

Maryam Heydari[1*], Maryam Moradnia[2], Mohammad Darvishmotevalli[3], Fatemeh Ehsani[4], Asiyeh Bazmeh[5], Sheno Ghaderi[6]

[1] Department of Environmental Health Engineering, Yasuj university of Medical Sciences, Yasuj, Iran; Maryam_heydari70@yahoo.com
[2] Student Research committee, Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran,Moradnia.mui@gmail.com
[3] Research Center for Health, Safety and Environment (RCHSE), Alborz University of Medical Sciences, Karaj, Iran, mohamad.darvish68@gmail.com
[4] Department of Environmental Health Engineering, Yasuj university of Medical Sciences, Yasuj, Iran; Maryam.mehrabanam@gmail.com
[5] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; as.bazmeh@gmail.com
[6] Department of midwifery, Faculty of nursing and midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran

***Corresponding author:** Maryam_heydari70@yahoo.com

Abstract

Aim of study: Healthcare waste comprises all waste generated at healthcare facilities, medical research centers and laboratories. Although, 75-90% of these wastes are classified as household waste posing no potential risk, 10-25% are deemed to be hazardous, which representing a potential threat to healthcare workers, patients, the environment and even the general population. Medical waste management is a universal issue. This study was accomplished with the purpose of designation qualitative and quantitative characterization of medical wastes production by Yasuj hospitals and give management information and healthy for better managing the hospital wastes and hospital health promotion.

Methodology: This study is kind of cross – sectional and it was performed on three hospitals in Yasuj city. The analysis of types of waste was accomplished seven times per month and did during six month for designation quantitative amount of wastes production. For scrutiny, wastes production management was used from tools of checklist and observation.

Results: Average quantity of wastes production in three hospitals studied was 61.239 kg in day that this amount for general wastes, infectious wastes, and sharp wastes were the 154.86, 77.79, and 7.64 kg in day. Capitation production hospital wastes for total wastes, general wastes, infectious wastes, and sharp wastes were the 1.45, 1.04, 0.36, and 0.05 kg for every bed in day. Management of medical waste was qualitatively ranked at different stages of waste management.

Conclusion: With respect to the high percentage of infectious wastes, it can be concluded that despite many efforts in conjunction with isolation and separation of hospital wastes, there are problems in this regard yet, that it need to be paid more attention by officials, also monitoring and corrections in some management methods are mandatory for reducing environmental impact of hospital wastes.

Keywords: Hospital waste, Waste management, Infectious waste, Yasuj

Evaluating the Performance of Health Inspectors in Public Places and Food Preparation and Distribution Centers against Covid 19 in Shahroud Environmental and Occupational Health Center

Sakineh Molaei Tavani[1], Aziz Mehr Ali[2], Shahrbanu Ashoori[2], Alaleh Dehmanesh[2], Rasoul Lotfizadeh[2], Nasreen Alyan Nejad[2], Akram Javadi[2]

[1] Environmental Health Engineering, Vice-Chancellor for student Affairs, Iran University of Sciences and Technology, Tehran, Iran; sakinehmolaei242@gmail.com
[2] Environmental & Occupational Health Office, Deputy Office for Health, Shahroud University of Medical Sciences, Shahroud, Iran; azizmehrali62@gmail.com. alalehdehmanesh@yahoo.com. rasullotfi165@gmail.com. aliyannejad8543@gmail.com. Ashori4@gmail.com. ak.j2158@gmail.com.

***Corresponding author:** Sakineh Molaei Tavani, Environmental Health Engineering, Vice-Chancellor for student Affairs, Iran University of Sciences and Technology, Tehran, Iran; sakinehmolaei242@gmail.com.

Abstract

Introduction: Given the widespread prevalence of corona virus and its effects on the health of this study was to evaluate the performance of businesses and the impact of health experts overseeing compliance with health protocols in stopping transmission service centers, industry, public places and centers of production and distribution.

Materials and Methods: This descriptive cross-sectional study was conducted in the first six months of 1999 to determine the role of intensifying expert inspections in reducing the incidence and prevention of coronary heart disease using a self-reported questionnaire of the Ministry of Health with some modifications (as needed). Data were analyzed and questionnaire information was analyzed using SPSS and Excel Microsoft software.

Results: From a total of 25,996 inspections carried out, the number of cases of observance of personal hygiene was 99.38%, the number of cases of using the mask of employees was 92.24%, the number of cases of using the mask of employees was 88.01%, The number of cases of social distancing 92.88%, the number of warnings and cases reported to judicial authorities was 2.53%, the number of sealed cases was 1.19%. Statistically significant relationship between the variables of personal hygiene ($P < 0.024$), number of cases of mask use ($P < 0.011$), number of cases of distance protocol ($P < 0.031$) the prevention Coronary heart disease was observed. There was also a positive and significant effect on the number of warnings and referrals to judicial authorities ($P < 0.016$), the number of sealed cases ($P < 0.027$) on the strict implementation of health protocols.

Conclusion: According to the results, the observance of health protocols by the trade unions in the first 6 months of the year was 93%. This indicates the good performance of health inspectors in public places and food preparation and distribution centers of Shahroud city against Covid 19. Therefore, in order to maintain and improve the current situation and deal with the next waves of the disease, control, health monitoring and legal measures should be pursued more seriously.

Keywords: Supervision, Covid 19, Mask, Social Distancing, Personal Hygiene

Examining the Relationship between Covid-19 Risk Management Status with Cases and Losses among Countries

Sara Emamgholipour[1*], Lotfali Agheli[2]

[1] Associate Professor of Health Economics, Tehran University of Medical Sciences; s-emamgholipor@tums.ac.ir
[2] Associate Professor of Economics, Tarbiat Modares University; aghelik@modares.ac.ir

Abstract

Covid 19, which became common in Wuhan, China in late 2019 with symptoms of acute respiratory syndrome, has been identified by the World Health Organization as a pandemic and an international threat to human societies. In Iran, since the first cases of the disease were reported so far, the first to third waves of the Covid-19 outbreak have affected different provinces and by December 27, 2020, have caused more than 14,000 infections and more than 650 deaths per one million people. The level of health preparedness of countries and the ability to manage risk and deal with crisis affect the statistics of cases and deaths due to Covid-19 disease. In this study, the relationship between INFORM Covid-19 risk index with the number of cases and deaths has been investigated. The results of the study show that countries with better risk management during the corona outbreak had lower mortality and morbidity rates, and less vulnerability to Covid-19 resulted in fewer mortality and morbidity. Increased monitoring of international and domestic flights and passengers, higher literacy rates in the population aged 15 and over, increased number of mobile subscribers, increased ratio of Internet users to the total population, increased public trust in government policymakers and health managers, low proportion of people with underlying diseases and the small share of the elderly in the total population reduce the vulnerability to Covid-19, followed by a reduction in the number of cases and deaths. According to the findings, the implementation of policies that reduce the risk of exposure to Covid-19 leads to a reduction in the number of Covid-19 cases and deaths. Changing people's behavior in the face of Covid-19, macro-socio-economic policies to reduce harms and macro-problems such as poverty and inequality, and coping policies with Covid-19 epidemics, including vaccination coverage and per capita physician are among these policies.

Keywords: Risk management, Vulnerability, Covid-19, Cases, Losses

Risk Characterization and Methods of Improving Practice for Municipal Waste Management in Disaster; A Case Study in Qom Province

Alireza Koohpaei [1], Majid Mohammadian [2], Yadollah Ghafuri [3*]

[1] Occupational Health Department, Work Health Research Centre, Qom University of Medical Sciences, Qom, Iran
[2] Health Center, Qom University of Medical Sciences, Qom, Iran
[3] Research Center for Environmental Pollutants, Qom University of Medical Sciences, Qom, Iran
Alireza.koohpaei, E-mail: koohpaei19@yahoo.com
Majid. Mohammadian E-mail: m.mohammadiyan45@gmail.com
Yadollah. Ghafuri E-mail: yadollahghafuri@yahoo.com

***Corresponding author**: Tel: +9832536602040

Abstract

Developing strategies to control environmental challenges and various aspects of health consequences of waste management is one of the major programs in metropolitan management. The aim of this study is risk characterization and methods of improving practice for municipal waste management in disaster in Qom province.A descriptive study was designed in two phases, in the first phase of the study, composition, quantity and characteristics of municipal solid waste in disaster were estimated and by using DotMapper software temporary waste sites for disaster situations (map waste) was determined. In the second phase of the study, the preliminary hazard analysis to identify the initial events and risk analyze in the municipal waste management system (PHA) were considered.shows that more than 50% of the generated waste in disaster is allocated to construction waste resulting from the destruction, more than 30% to recyclable items (metals, glass, plastic, and etc.) And a very small part of about 1% of biodegradable waste was determined. Twenty urban points were designated as temporary sites for municipal waste in disaster situation. Results of risk analyze in disaster was described that, for 3 events containing lack of temporary waste storage sites in different urban areas, lack of identification and determination of hazardous waste production centers in urban areas and lack of waste management training program in emergency situations for all people involved in waste management, were in the red range and as a main priority of the waste management organization in disaster plan, should be considered.

Developing the necessary strategies to control environmental challenges and various aspects of health outcomes in waste management is one of the basic programs in metropolitan management.

Translation copied

Key Words: Qom, Waste, Management, Disaster, Risk

COVID-19 and Environment

RezaFouladi-Fard [1] ,Nayereh Rezaie Rahimi [2], Mohammad RezvaniGhalhari [3], RahimAali [1], MostafaRezaali [4], Mahdi AsadiGhalhari [1], AliShahryari [5],Yadollah Ghafouri [1], Babak Farzinnia [1], Mahsa Rezaei [6]

[1.]Research Center for Environmental Pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran
[2.] Department of Environmental Health Engineering, Shiraz University of Medical Sciences, Shiraz, Iran.
[3]. Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
[4.] Independent Researcher, Isfahan, Iran (Formerly: Department of Civil and Environmental Engineering, Qom University of Technology, Qom, Iran)
[5.] Department of Environmental Health Engineering, Gorgan University of Medical Sciences, Gorgan, Iran
[6.] Department of Environmental Health Engineering, Shahid Beheshti University of Medical Sciences, Tehran, Iran

***Corresponding author:** Nayereh Rezaie Rahimi(s.rezaie51@gmail.com)

Abstract

The global crisis caused by SARS-CoV-2 (COVID-19) affected economics, social affairs, and the environment, not to mention public health. .One of the most controversial topics on this virus is its transmissibility via particles,airborne and bioaerosols. This review was based on an electronic search of literature in the Scopus, SienceDirect and PubMed database published from December 2019 to December 2020 using combinations of the following keywords: SARS-CoV-2 transmission, COVDI-19 transmission, coronavirus transmission, waterborne, wastewater, airborne, fomites and fecal-oral transmission. Studies suggest the thermal properties of ambient air, as well as relative humidity, may affect the transmissibility and viability of the virus. Samples taken from the wastewater collection network were detected contaminated with the novel coronavirus; consequently, there is concern of its transmission via an urban sewer system. There are concerns about the efficacy of the wastewater treatment plant disinfection process as the last chance to inactivate the virus. Collectively, studies suggest that the environment can hinder the spread of SARS-CoV-2. On the other hand, it is confirmed that the viral outbreak, indirectly, decreased urban atmospheric pollution. Besides, environmental resources are found to be a factor in transmitting the virus beyond geographical borders. Accordingly, countries need to pay extra attention to sustainable development themes and goals.

Keywords: COVID-19 ،SARS-Cov-2 ،Air transmission ،Wastewater ،Fomites

Evaluation of the Efficiency of Social Distancing Plan on Observing Hygienic Principles in Food Preparation and Distribution Centers

Mahrokh Jalili[1], Fariba Abbasi[2], Mohammad Hossein Salmani[1], Vahideh Damani[1], Roya Malek Ahamdi[1], Mehdi Mokhtari[1]*

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Department of Environmental Health Engineering, School of Public Health, Shiraz University of Medical Sciences, Shiraz, Iran.

***Corresponding author:** Mehdi Mokhtari, mhimokhtari@gmail.com

Abstract

Background: During the implementation of the Intelligent Social Distancing Plan, by the Corona Headquarters, food preparation and distribution centers have been required to use health protocols that are expected to be effective in the spread of the disease. Since in this period, most social connections were related to these centers with each other and other people in the community.

Objective: Trend changes in the adherence of food distribution centers to the approved health principles in the health protocols of Corona headquarters in southeastern cities of Iran have been investigated.

Materials and Methods: In this study, hygienic principles in food distribution centers including, the use of personal protective equipment, disinfection, waste management, installation of hygienic posters, proper food coverage, and non-smoking were monitored during this program. The results were analyzed using analytical and descriptive statistics and its correlation with time by Pearson, and the difference between the variables was determined by t-test in MATLAB 2018.

Results: During the design period, the minimum and maximum rates of attention were paid to the use of personal protective equipment (63.2 ± 0.08%) ($p < 0.0001$) and non-smoking (93.6 ± 0.06) ($p < 0.0001$). The highest and lowest coefficients of change were related to food coverage (CV=0.82; 33-100%) and continuous cleaning of the union unit (CV=0.22; 75-95%), respectively. During this period, information-education and occupational health issues such as the installation of educational posters and employees' access to disinfectants have been declining, but issues related to environmental health principles such as proper coverage in prepared foods ($R^2=0.4$) trend had an increase ($p<0.0001$).

Conclusion: In general, it can be concluded that during the smart social distancing plan, the adherence of these centers was focused on health principles, the non-observance of which was accompanied by legal prosecution. However, these cases have been drastically reduced due to the lack of obligation and follow-up based on the use of personal protective equipment by the Corona headquarters, which has played an effective role in the corona transfer. Also, by informing the employees of food centers, we can expect the transfer of corona through these jobs to be reduced.

Keywords: Smart social distancing, Corona, Environmental health, Food distribution centers

The Effect of Environmental Factors on the Transmission of SAR COV-2 and the Prevalence of COVID-19 Pandemic

Mahrokh Jalili [1], Fariba Abbasi [2], Fatemeh Babaei [1], Aali Asghar Ebrahimi [1], Mohammad Reza Samaei [2] Mehdi Mokhtari [1]*

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2] Department of Environmental Health Engineering, School of Public Health, Shiraz University of Medical Sciences, Shiraz, Iran

***Corresponding author:** Mehdi Mokhtari, mhimokhtari@gmail.com

Abstract

Background: SARS COV-2 is a major cause of COVID-19 pandemics. The pandemic is now affecting countries around the world. One of the main ways the virus is transmitted is through exposure to respiratory aerosols by carriers. Therefore, environmental factors play a major role in its transmission.

Objective: In this study, the routes of transmission of SARS COV-2 and the prevalence of pandemic in different environments, including air, water, and food have been investigated by examining its effectiveness.

Materials and Methods: In this study, Google scholar, PubMed, Scopus, and ISI databases from March 2017 to October 2016 have been reviewed.

Results: The possibility of transmitting bioaerosols through the air has been reported in closed environments, especially hospitals and places with poor ventilation, that it has been said that infectious bioaerosols can be moved up to a distance of 6 feet. However, increasing outdoor temperatures and sunlight can eliminate SARS COV-2 and reduce the virus' stability on smooth surfaces with higher coronavirus stability. With increasing the minimum ambient temperature every 1 ° C, the cumulative number of cases decreases by 0.86%. On the other hand, the presence of SARS-CoV-2 in sewage has been confirmed, but so far, there is no evidence that coronavirus has been transmitted through contaminated drinking water. The prevalence of COVID-19 through food, food packaging, and food workers has not been identified as a risk factor for the disease. There have been no reports of transmission of SARS COV-2 by blood-sucking arthropods such as mosquitoes. However, some studies have suggested that insects such as beetles and house insects, which are the main mechanical carriers of pathogens, are involved in transmission through contact with contaminated surfaces and patient secretions.

Conclusion: Transmission of coronavirus by indoor air is the main method of transmission through the environment, which improves the indoor environment such as using proper ventilation with natural ventilation is the primitive solution to reduce virus transmission.

Keywords: COVID-19 Pandemic, Environmental effects, Meteorological parameters

Knowledge and Practice of Service Providing Personnel of Hospital about Ways of Infectious Diseases Transmission through Hospital Waste in Qaem Hospital, Mashhad, 2018

Maryam Paydar *[1], Zahra Tahari [2], Mohammad Vahedian Shahroodi [3], Zahra Tokhmkar Marghzar [2], Maryam Daroodi [2]

[1] MSc,Environmental health specialist, Department of Environmental Health Engineering, faculty Health, Mashhad University of Medical Sciences, Mashhad, Iran. Email: Paydarm1@mums.ac.ir
[2] BS, Department of Environmental Health Engineering, , Mashhad University of Medical Sciences, Mashhad, Iran.
[3] Mohammad Vahedian Shahroudi Associate Professor, Department of Health Education and Health Promotion, Research Center for Social Factors Affecting Health, School of Public Health, Mashhad University of Medical Sciences, Mashhad, Iran)

***Corresponding author:** Email: Paydarm1@mums.ac.ir

Abstract

Background and Objectives: Since 10-15% of hospital waste is infected, it is one of the major problems in the solid waste management especially in developing countries. Hospital service personnel are effective in control of nosocomial infections .Determination of the knowledge and performance of Qaem Hospital service staff in dealing with various hospital wastes.

Materials and Methods: The present research is a cross-sectional study and conducted on 176 service personnel. The data was collected by a questionnaire including demographic information, related information about the ways of Infectious Diseases Transmission through Hospital Waste, in Qaem hospital. Finally, data was analyzed by SPSS Version16.

Results: The result showed that 84 % of pupation studied included women and 16 % were men. The average age of them was in range 30 - 50 years old. Only 55.48% of them had a good knowledge about the infectious hospital waste and transmitted infectious diseases; while 93.29% had a good performance. The Knowledge and performance in male and female groups were not different ($p > 0.05$). The score of the knowledge in service providing personnel by over 50 years old, was about 1.5 - 2 more than others groups. According to statistical analysis, there is a significant difference between the level of knowledge of the service personnel and age. Staff performance by lower diploma was better than diploma and higher diploma ($p < 0.05$).

Conclusion: According to the findings of this study, the performance of Qaem Hospital service was relatively in a good level; but their knowledge about detection of infectious wastes was low. It is suggested that the hold educational classes be held for improving the level knowledge.

Keywords: Knowledge, Practice, Hospital, waste, Mashhad.

A Review of the Effects of COVID-19 Pandemic on Food Waste Management

Fatemeh Kordeyazdi[1], Fatemeh Khakbaz [1], Seyede Maryam Sharafi[2], AmirHossein Nafez [2, 3,*]

[1] Student Research Committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Ira; kordyazdif@gmail.com, f.khakbaz@gmail.com
[2] Environment Research Center, Research Institute for Primordial Prevention of Non-Communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran; sharafi_maryam62@yahoo.com
[3] Department of Environmental Health, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

***Corresponding author:** Amir Hossein Nafez, Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Hezar Jerib Avenue, Isfahan, Iran E-mail: amirnafez@hlth.mui.ac.ir

Abstract

Aims and background: The corona virus has been a significant threat to public health worldwide since its outbreak in late of 2019. Our aim was to investigate the impact of Covid-19 epidemic on food waste management. This study examines the short-term and long-term consequences of this health crisis on the production of food waste in the world.

Methods: In this study, the keywords Food Waste and COVID-19 were used in the text of articles indexed in SCOPUS and GOOGLE SCHOLAR databases during two months (10/12/2020 to 12/12/2020) and all scientific documents providing any information on food waste during the Covid 19 pandemic were reviewed. Finally, after reviewing the titles and abstracts of these articles, 17 articles from twelve different countries were selected and their full text was independently evaluated by the authors. The criterion for selecting articles in the mentioned sites was based on the content and topics in the field of waste management in the context of the Covid pandemic.

Results: Perhaps no phenomenon has changed the parameters of household waste generation as quickly and fundamentally as the outbreak of the Covid-19 pandemic. Covid 19 has made a lot of changes in terms of food consumption including: food accessibility, food safety, and food waste. Despite the fact that in the case of Covid-19 pandemic, most meals are prepared and consumed at home and less food waste is generated however, pandemic conditions due to changes in work patterns, food services, and food retail may also increase food consumption.

Conclusion: This study revealed that there is opportunity for improvement in the field of waste management cycle from the collection of food waste to its disposal. As a result, it is recommended that governments provide appropriate programs to reduce food waste along with the spread of epidemic diseases. Establishing flexible regional food supply chains is also essential to deal with such conditions during future epidemics.

Keywords: Food waste, Covid-19, Pandemic, Municipal solid waste (MSW)

Awareness and Appropriate Use of Disinfectants in Association with the Geographical Distribution of the COVID-19 Incidence

Reza Fouladi-Fard [1], Zahra Safari [1,2], Razieh Vahidmoghadam [1], Mohammad Raza Hosseini [2,*], Abolfazl Mohammadbeigi [3], Mostafa Rezaali [4], Maria Fiore [5]

[1] Research Center for Environmental Pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran; zsafari353@gmail.com; rfouladi@muq.ac.ir; r1375vahid@gmail.com
[2] Student Research Committee, Qom University of Medical Sciences, Qom, Iran; m.reza68.h@gmail.com
[3] Department of Public Health, Faculty of Health, Qom University of Medical Sciences, Qom, Iran; beigi60@gmail.com
[4] Independent researcher, Isfahan, Iran (formerly: Department of Civil and Environmental Engineering, Qom, Iran); mostafarezaali@gmail.com
[5] Department of Medical, Surgical and Advanced Technologies "G.F. Ingrassia", University of Catania, Catania, Italy. Via Santa Sofia, 87 – 95123 Catania; mfiore@unict.it

***Correspondence**: m.reza68.h@gmail.com

Abstract

One of the health mechanisms during the outbreak of Coronavirus disease 2019 (COVID-19) was the use of disinfectants according to the health protocols. Therefore, the purpose of this study was to investigate the knowledge and practice of citizens of Qom province in the use of disinfectants and compare its relationship with the geographical distribution of COVID-19 outbreak in the spring of 2020. Data were obtained from Qom health department and then analyzed using Excel, SPSS, and ArcView (GIS) software. According to the results, the level of awareness of citizens about disinfectants was often (52%) in the poor range, while 56% of the performance of citizens was reported in the good range. Spearman correlation analysis showed that there was a strong correlation (rho 0.95) between the mean of total knowledge and practice ($P < 0.01$). Region 7 had the highest prevalence of COVID-19, which received the lowest mean score in terms of knowledge and practice. In addition, ANOVA (LSD) results showed that there was a significant difference between Region 7 ,in terms of low mean scores in citizens' awareness and performance, and other regions ($P < 0.05$). As a general conclusion, the level of awareness of citizens was lower than their performance. As a general conclusion, the level of awareness of citizens was lower than their performance. This conclusion not only calls for more educational programs to be implemented in public places, schools, universities, and government offices, but also forces on the maintenance of appropriate and timely education on the use of disinfectants.

Keywords: Knowledge, Practice, Disinfectant, COVID-19

Investigation of the Relationship between Nitrate and Nitrite Concentrations with Total Coliforms in Drinking Water

Azhdarpoor A [1], Golaki M * [2]

[1] Associate Professor, Department of Environmental Health Engineering, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran.
[2] Department of Environmental Health Engineering, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran.

***Corresponding author:** Email:m_golaki@yahoo.com Tell:09178201040

Abstract

Providing safe drinking water is one of the basic needs of human societies and the health of a society is deeply dependent on the quality of drinking water. The aim of this study was to investigate the relationship between nitrate and nitrite with total coliforms as important parameters affecting the quality of drinking water. The study population in this study was data related to 25 drinking water wells. For this purpose, first the normality of drinking water data of sampling points was investigated and due to the non-normality of the studied data, the relationship between nitrate and nitrite concentration with total coliform was analyzed by SPSS software version 25 and nonparametric Spearman test. The mean concentrations of nitrate, nitrite, and total coliform were 13.5, 0.008 mg / l and CFU / 100 ml, respectively. The results of statistical analysis showed that the p-value for nitrate and nitrite were 0.983 and 0.487, respectively, and the Spearman correlation coefficient was 0.004 and 0.146, respectively. Since the p-value of both nitrate and nitrite contaminants was much higher than 0.05 and the Spearman correlation coefficient was close to zero in both cases. Therefore, no significant relationship and correlation was observed between nitrate and nitrite concentrations with the amount of total coliform.

Keywords: Total coliform, Nitrate, Nitrite, Drinking water

Survey of knowledge, Attitude, and Practice of Isfahan Medical Science's Students about new Coronavirus, Routes of Transmission and Prevention

Fatemeh Hajialikhani [1]*, Sepideh Sadeghi [2], Farzaneh Mohammadi [3], Mahnaz Nikaeen [4]

[1*] Corresponding Author: B.S Student of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; fatemehalikhani1234@gmail.com
[2] MSc student in Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran; Diba13740@gmail.com
[3]Assistant Professor of Environmental Health Engineering, Faculty of Health, Isfahan University of Medical Sciences, Isfahan, Iran; fm_1363@yahoo.com
[4] Professor of Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran; nikaeen@hlth.mui.ac.ir

Abstract

Introduction: In 2019, a type of pneumonia of unknown cause was reported to the World Health Organization (WHO) from Wuhan, China, which was named "Corona Virus 2019". The infection spread rapidly in many countries and became an international concern and epidemic. Because of the chain of transmission and the wide prevalence of the disease, the knowledge, attitude, and practice of the people in the community are important to prevent the transmission of the infection. Therefore, this study was conducted to determine the level of knowledge, attitude, and practice (KAP) of Isfahan University of Medical Science's students about new coronavirus, routes of transmission and prevention in 2021.

Methods: In this study, 252 students of Isfahan University of Medical Sciences were studied by stratified sampling. The data collection tool was a 40-item researcher-made questionnaire with validity and reliability. Out of 40 questions in the questionnaire, 3 questions were related to the demographic section, 10 questions were related to the awareness section, 12 questions were related to the attitude section, and 14 questions were related to the performance area. Data were analyzed by Mann-Whitney and Kruskal-Wallis tests after entering SPSS26.

Results: The average score of students' knowledge was 20.36 ± 2.04 (with a score range of 0 to 24), attitude was 56.96±5.70 (with a score range of 7-68), and performance was 10.37±0.93 (with a score range of 0-11). The results showed that the knowledge, attitude and performance of students at the desired level. In this study, there was no significant difference between knowledge and attitude with the variables of education, faculty, and gender.

Conclusion: Due to the related scores, most of students acquired necessary knowledge, attitude, and proactive practice in response to COVID-19 outbreak. An educational program on health behaviors through mass media, pamphlets and posters not only in epidemic and pandemic conditions, but also on a daily basis as well as implementation of a preparedness strategy to deal with and control the disease can be effective to increase awareness, attitude and the performance of the people in preventing the widespread transmission of disease in the society.

Key words: Knowledge, Attitude, Practice, Corona Virus, Isfahan

Evaluation of the Community Health Preparedness against COVID-19

Hassan Hashemi[1], Atefeh Mohammadi[*2], Masoud Karimi[3]

[1] Assistant Professor, Research Center for Health Sciences, Institute of Health, Department of Environmental Health Engineering, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran. Email: h_hashemi@sums.ac.ir
[2] MSc student of health education and health promotion, Department of Health Promotion, school of Health, Shiraz University of Medical Sciences. Email: a.m9225@yahoo.com
[3] Assistant Professor, Department of Health Promotion, school of Health, Shiraz University of Medical Sciences. Email: masoudkrm@yahoo.com

***Corresponding author:** Email: a.m9225@yahoo.com

Abstract

Introduction and Purpose: In 2019, the pneumonia associated with Coronavirus (COVID-19) appeared in Wuhan, China, and it was quickly released between other countries in the world, including Iran. In addition to physical damage, the virus has an adverse effect on the mental health of the community. The aim of this study is to study the level of health readiness of the community against the COVID19 epidemic.

Method and Materials: In this cross-sectional study, the study population consisted of all women and men in the community and participants were randomly selected. Researcher-made questionnaire were used for data collection.

Results: 1194 people completed the questionnaire that in the obtained data, 59% of the statistical population were women and 41% were men. Based on the analysis of the data, fear of the possibility of death of loved ones, fear of attending parties, fear of going to medical centers, fear of using public transportation (bus, subway), consumption of nutritious foods and vegetables, have increased much. Also, use of masks on sick people, use of gloves, frequent hand washing with soap and water, disinfection of hands with disinfectants, disinfection of surfaces and personal items, consumption of fully cooked food, ventilation of closed environment to prevent it has increased a lot since the 2019 coronavirus.

Conclusion: According to this study, the level of public awareness and health preparedness against the new coronavirus (COVID-19) epidemic in the early days of the epidemic was high, and this was an important contribution to the health system. Continuing with the normalization of conditions, environmental readiness was prepared for the spread of the disease and the occurrence of subsequent peaks. This crisis can be overcome with the least number of deaths by changing sustainable health behavior, the lifestyle of the society and principled policies based on evidence in the health sector

Keywords: COVID-19, EPPM Model, Health preparedness

The Importance of Disinfection and Antisepsis in the Control of COVID-19

Hamideh kamali Jafarabadi [1], Ali Rasooli [2*], Mehdi Mokhtari [3]

[1]Environmental Science and Technology Research Center. Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd , Iran
Hamide.kamali96@gmail.com
[2]Environmental Science and Technology Research Center. Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd , Iran
Alirasooli7613@gmail.com
[3,2] Environmental Science and Technology Research Center. Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd , Iran
Mokhtari@ssu.ac.ir

Abstract

Introduction: Corona is a new disease that was discovered in China in December 2019. The virus, which is a member of the coronavirus family and appears as an acute respiratory infection, is common between humans and animals. The discovery of this virus led to extensive studies in the field of virus identification, pathogenicity, finding treatments and ways to prevent its transmission. One of the most important ways to prevent the transmission of Coronavirus 2019 is to use antiseptics and disinfectants. The present study is a review of the findings related to various antiseptics and disinfectants used against coronavirus 2019, which are presented in four separate sections.

Materials and Methods: In this review study, articles indexed in Persian and Latin databases of Google Scholar, PubMed, Science Direct, SID, CIVILICA and reports of the World Health Organization (WHO) in 2019 and 2020 were examined. The keywords used in the search were: Disinfection, Disinfectant, Antiseptic, Covid19, and Coronavirus. Finally, 18 related articles were reviewed.

Findings: In this study, Reviewed the findings related to various antiseptics and disinfectants, the effect of their use in preventing the further spread of the disease and inactivating the coronavirus, precautionary and preventive measures in hospital, clinical and dental departments, as well as Technologies and strategies disinfection of hospital waste and medical treatments related to Coronal sections were examine.

Conclusion: The research results showed that there is sufficient evidence that the virus is transmitted to others and its ability to cause severe and fatal disease. The persistence of the virus in the environment and its transmission through humans to humans through simple routes such as breathing, talking, coughing or sneezing, respiratory droplets as well as its transmission through contaminated surfaces, the importance of using antiseptics and disinfectants in preventing and controlling the spread Shows the disease in various places, especially in public places and health care institutions.

Keywords: Disinfection, Disinfectant, Antiseptic, Covid19, and Coronavirus

A Review of the Health Effects of Environmental Exposure to Disinfectants during the COVID-19 Outbreak

Bahare Dehdashti[1,2*], Mohammad Mehdi Amin[2,3], Shadab Dabagh[4], Mehdi Mokhtari[5]

[1] Student Research Committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.
[2] Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.
baharehdehdashty@yahoo.com, Mohammadmehdia@gmail.com
[3] Environment Research Center, Research Institute for Primordial Prevention of Non-communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran.
[4] Fartak Nanobiotech Co., Center of Entrepreneurship, University of Isfahan, Isfahan, Iran
Shadabdabagh077@gmail.com
[5] Department of Environmental Health Engineering, Environmental Health Research Centre, Faculty of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. mhimokhtari@yahoo.com

***Corresponding authors:** Bahare Dehdashti, baharehdehdashty@yahoo.com

Abstract

Since the outbreak of Covid 19, disinfectant chemicals, in addition to the benefits of using them to kill and control of the pathogens, have provided significant exposure to humans and the environment through improper use. They will have destructive effects on the ecosystem and human health in the long term. In this study, based on articles published in 2020 and a search in scientific databases, an attempt has been made to review the health effects of exposure to disinfectants during the outbreak of Covid 19. The results of studies have shown that improper and excessive use of disinfectants, in addition of causing serious problems in human health, such as skin diseases, respiratory, kidney, muscle disorders and so on, it has reduced the quality of indoor air by bonding to indoor dust, which itself is the cause of various diseases. In addition to endangering aquatic life, the release of disinfectant by-products in aquatic environments has also harmful effects such as bladder cancer and abortion. Subsequently, the long term quarantine in the home during the Covid 19 are expanded exposure to internal pollutants such as cigarette smoke, disinfectants, bacterial and fungal pathogens due to poor ventilation and building characteristics, as well as stress and depression caused by it. This in itself can be effective in causing the Sick Building Syndrome. Severe disinfection of external environments has also been effective in disrupting the health and habitat of living organisms and destroying ecosystems. Therefore, the application of management and scientific methods in the correct use of disinfectants and the manufacture of different concentrations of solutions in accordance with international guidelines and instructions and the appropriate time of their use is necessary.

Keywords: Covid-19, Environmental Exposure, Disinfection, Health Effects

Control of COVID-19 Transmission Chain in Food Contact Material units of Tabriz Petrochemical Company by Increasing the Control Measures of ISO22000 Management System

Habib Bakzadeh [1], Ahmad Tahmasebi [2], Ahmad Oudi [3] Mehdi Gholami[4], Nariman Azimi [5], Sanaz Asemani[6]

[1] M.Sc student of Inviromental Health, Hamedan University of Medical Sciences, Health expert of Tabriz Petrochemical Company, Member of Tabriz HSE association, Tabriz petrochemical company, .
[2] Manager of Quality control (QC), Tabriz petrochemical company.
[3] Head of monitoring and evaluation of health product quality control, Tabriz petrochemical company.
[4] Manager of Health, Safety and Enviroment,Tabriz petrochemical company.
[5] Head of Tabriz Petrochemical Health, Tabriz petrochemical company
[6] M.Sc of Nutrition, Tabriz University of Medical Sciences, Dietitian of Taleghani Hospital, Tabriz.

***Corresponding author:** Habib bakzadeh

Abstract

Tabriz's petrochemicals inorder to produce food contact for exporting and as well as the interior consumption, start to FCM a number of its units to ensure consumer health of petrochemical production materials, which was the conditions for the ISO 22000 certificate of units. Implementation of ISO 22000 requirements includes antigen such as environmental health, individual health, public health, disinfection, sterilization, migrations of the chemicals and so on. Since late 98, according to the prevalence of corona disease, HSE management was able to control covide 19 disease by increasing controled actions mentioned in ISO requirements of FCM units.

Keywords: Corona , FCM , ISO22000 , Petrochemical

Challenges and Opportunities during the Rise of Plastics due to the Covid Epidemic 19

Fatemeh Khakbaz [1], Fatemeh Kordeyazdi [2], Amir Hossein Nafez [2*]

[1] BS student in Environmental Health - Student Research Committee, School of Health, Isfahan University of Medical Sciences ; Email address (kordyazdif@gmail.com)
[2] BS student in Environmental Health - Student Research Committee, School of Health, Isfahan University of Medical Sciences ; Email address (f.khakbaz@gmail.com)
[3] Faculty member of Isfahan Department of Environmental Health, Medical Sciences; Email address (nafez.amirhossein@gmail.com)

Abstract

The Covid epidemic has led to an increase in the use of face masks and medical waste in the environment. The normal activities of individuals are out of the ordinary and have changed the trend of waste generated by households, and most importantly, all medical centers and quarantine centers. The aim of this study was to evaluate the effect of Covid 19 disease on the production of plastic waste.
In this article, the keywords covid 19, plastic waste, waste management in articles indexed in SCOPUS and GOOGLE SCHOLAR databases were used during a month, and finally 10 articles from ten different countries were reviewed. The criterion for selecting articles in the mentioned sites was based on the content and topics in the field of waste management in the context of the Covid 19 epidemic.
According to studies conducted in urban systems, solid waste is produced on a daily basis and needs daily management. Due to the accumulation of waste or water stagnation, the risk of being associated with the prevalence of pathogens in drinking water supply and waste disposal may increase. The United States has led to an explosion of plastic waste pollution.

Keywords: Infectious Waste, Solid Waste Management, Covid 19

Assessing the Status of Special Waste Management in the Context of the Corona Pandemic Crisis: A Case Study of Two Patient Reference Hospitals

Zahra Mohammadi [1], Mehdi Balvayeh [2]

[1] Zahra Mohammadii, Shahid beheshti medical university; Z.mohammadii1996@gmail.com
[2] Mehdi balvayeh, Torfeh Hospital; balvayehmehdi@yahoo.com

***Corresponding author:** Zahra Mohammadi

Abstract

In the recent decade, coronaviruses have caused large-scale pandemics namely, severe acute respiratory syndrome coronavirus-1 (SARS-Cov-1) and the Middle East respiratory syndrome (MERS). Anew outbreak in this family is added in November–December of 2019 as the novel coronavirus disease-2019 (COVID-19). Soon after pneumonia disease outbreak in Wuhan (in Hubei province of China), the transmission of COVID-19 has been found by human-to-human contact and declared a pandemic of global crisis. Consequently, COVID-19 has wreaked havoc and became a matter of severe global concern. Until now, no specific drug or vaccine is specifically known to treat COVID-19 patients. Mass sampling with rapid tests, isolation of suspects/patients, use of personal protective measures, social distancing, and life-supporting treatments are among the known countermeasures to prevent/fight this fatal pandemic. Personal protective equipment (PPE), surgical (and protective) facemasks, aprons/gowns, and nitrile gloves are essentially used to protect individuals from exposure to pathogens and contaminants. Traditionally, these protective measures have been predominantly used against pathogens in hospitals. However, COVID-19 has necessitated their usage in domestic isolation and individual protections, leading to a rapid accumulation of potentially infectious waste streams (hereinafter, COVID-waste). The entire world is, therefore, facing an unprecedented challenge to fight COVID-19 together with the myriad COVID-waste. The drastic increase in COVID-waste from 40 tons/day to 240 tons/day in Wuhan and estimated increase from 5 million tons/year to 2.5 million tons/month in the US is scary if not treated properly. Since the pandemic outbreak, South Korea has generated about 2000 tons of COVID-waste until the starting of May 2020.

Keywords: Covid-19, Waste management, Biomedical waste, Biomedical waste treatment, Hospital

Investigating the Role of Environmental Health after Accidents and Disasters in Different Countries

Fazel Mohammadi-Moghadam [1], Farideh Bagherzadeh [2], Marzieh Farhadkhani [3], Sara Hemati [*4]

[1]Associate Professor of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: fm.moghadam@skums.ac.ir
[2] Masters of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: farideh.b71@gmail.com
[3] Assistant Professor of Environmental Health, Educational Development Center, Shahrekord University of Medical Sciences, Iran; Email address: m_farhadkhani@yahoo.com
[4] Ph.D Student of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: hemati.sara88@yahoo.com

***Corresponding Author**: Sara Hemati, Ph.D Student of Environmental Health, Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Iran; Email address: hemati.sara88@yahoo.com

Abstract

The issue of disaster risk management and reduction has always been a challenging issue in the country's health system. Numerous incidents have shown that the drinking water is the main need after disasters, which is often followed after for food and shelter.

The purpose of this study is to investigate the role of environmental health after accidents and disasters in different countries. The preparedness of environmental health professionals after natural disasters is essential for a quick and effective response. During a natural disaster or other emergency such as the COVID-19 pandemic, the environmental health system plays a key role in providing services to protect affected people with an emphasis on preventing and controlling infectious diseases and exposure to hazardous substances. Environmental health professionals with a wide range of skills, have not only a basic role, but also a unique role in preventing accidents and disasters from emerging diseases such as COVID-19. However, it is essential that governments support their work across the region and make them key stakeholders in health decisions. Although environmental health is a subset of public health, less attention is paid to its role. Therefore, training, preparation, skills acquisition and strengthening the relationship between health organizations in carrying out appropriate environmental health measures after the occurrence of a disaster is very important.

Keywords: Crisis, Environmental health measures, Risk management

The Most Important Challenges for Environmental Health Specialists in Combating COVID-19 Pandemic

Azam Nader , Sara Yaghoubian

Abstract

Background and Objectives: COVID-19 virus has become a global epidemic. Its relationship with environmental factors is an important issue which has been considered by many scientists, recently. Issues of Infection control such as SARS-COV-2 have complex nature. An evolutionary approach for preventive health is needed to address the current and future epidemics, and in a world with limited and specialized degrees, the Environmental Health specialists have a wide range of skills by them, they can serve as a basis for examining the associated risks of each exposure route and finding the right path by considering all aspects involved. Therefore, the purpose of this study is to collect information on the stability of the new virus in air, surfaces, water, and wastewater and the effective role of environmental health Specialists in dealing with these issues.

Materials and Methods: in this article, the most important challenges of environmental health engineers in dealing with the COVID-19 epidemic and solutions to deal with them are reviewed.

Results and Conclusion: Increasing plastic and medical waste and the production of emerging pollutants are the most important consequences of combating the COVID-19 epidemic. The role of environmental health Specialists in combating the virus and managing the changes is very important and their intervention in one area can lead to maximum impact on the whole community.

Keywords: COVID-19, SARS-COV-2, Environmental Health Specialists, Epidemic, Environmental pollution

Healthcare Waste Management during Covid-19 Pandemic

Farnaz Ghandehari yazdi [1*], Mehdi Mokhtari [2], Ahmad Golshiri [3], Sahba Sahifi [4]

[1] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Farnazghandehari98@gmail.com
[2] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. mokhtari@ssu.ac.ir
[3] Environmental Science and Technology Research Center, Department of Environmental Health Engineering, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Golshiri1995@gmail.com
[4]Department of Environmental Health Engineering, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran. sahba_sahifi@yahoo.com

Abstract

Covid19 is one of the world-wide spread diseases now, Since Covid19 can be transmitted in different ways and can cause morbidity and even death in the population, special measures must be taken, including the use of personal protective equipment, this will cause a huge amount of produced waste, especially health care wastes. It can be noted that health care centers will play an important role in increasing the amount of waste related to Covid19, so the management of waste generated in these centers requires a lot of attention and the health care waste of covid19 and safe management is one of the problems of today's society. Important elements in health care waste management, including the generation, storage, collection, transportation, processing, recycling, and final disposal. Each of these elements requires specific strategies mentioned in the text. According to the studies done, results show that there are various challenges from generation to disposal in different parts of waste management, which can cause problems for staffs who work with these wastes. It can be concluded that stricter rules should be considered for different stages of waste management from production to disposal. Moreover, the necessary training should be given to the responsible staff in order to reduce the risk of infection and mortality statistics and prevent the abuse of profiteers and garbage thieves.

Keywords: Health care waste, Hospital waste, Covid-19, Infectious waste

Association of Home Quarantining and Sick Building Syndrome during COVID-19

Hassan Hashemi [1], Atefeh Mohammadi [*2], Masoud Karimi [3]

[1] Assistant Professor, Research Center for Health Sciences, Institute of Health, Department of Environmental Health Engineering, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran. Email: h_hashemi@sums.ac.ir
[2] MSc student of health education and health promotion, Department of Health Promotion, school of Health, Shiraz University of Medical Sciences. Email: a.m9225@yahoo.com
[3] Assistant Professor, Department of Health Promotion, school of Health, Shiraz University of Medical Sciences. Email: masoudkrm@yahoo.com

***Corresponding author:** Email: a.m9225@yahoo.com

Abstract

Introduction and Purpose: The coronavirus (COVID-19), an acute respiratory illness, is the seventh virus to emerge in Wuhan, China. One of the recommendations to reduce the prevalence of this disease is Self-quarantine at home. Because people spend most of their time at home, Self-quarantine has a number of side complications. One of these complications is the onset of symptoms of disease-building syndrome. Therefore, the aim of this study was to investigate the relationship between home quarantine and the occurrence of symptoms of disease-building syndrome during the COVID-19 epidemic.

Method and Materials: In this cross-sectional study, the study population consisted of all men and women in the community and participants were selected by random sampling. A researcher-made questionnaire was used to collect information.

Result: A total of 172 people completed the questionnaire, of which 75% of the statistical population were women and 25% were men. Regarding specific diseases, 92% of the statistical population had no specific disease and 8% of them had specific disease. Also, based on the analysis of the data, the characteristics of the place of residence, excessive use of detergents and disinfectants, and preparation of grilled and fried foods at home with SBS allergies, which include itching or watery eyes; Dryness, itching, inflammation of the skin; runny nose ; Nasal congestion; Dry throat; Abnormal fatigue; headache; Nausea is significantly associated.

Conclusion: Home quarantine is considered as an important and effective solution against COVID-19 outbreak. However, staying in the home for a long time has side effects such as SBS. According to the results of this study, due to the multiplicity of risk factors, susceptibility to sick building syndrome is also common in people. It may be considered as having COVID-19 and by increasing the number of unnecessary visits to medical centers will increase the burden of visitors. Therefore, it is necessary to provide healthy lifestyle education to residents on how to use detergents and disinfectants, avoid frying and grilling food and proper ventilation of the house. Healthy life style during home quarantine and self-isolation reduces the incidence of sick building syndrome and reduces people's susceptibility.

Keywords: COVID-19, SBS, Home-quarantine