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Data Article

Data on metal levels in the inlet and outlet wastewater treatment plant of hospitals in Bushehr province, Iran

Fereshte Babaahmadi ^a, Sina Dobaradaran ^{b,c,d,*},
Abdolrahim Pazira ^e, Seyed Sajjad Eghbali ^f,
Maryam Khorsand ^g, Mozhgan Keshtkar ^c^a Department of Environmental Engineering Bushehr branch, Islamic Azad University, Bushehr, Iran^b The Persian Gulf Marine Biotechnology Research Center, Bushehr University of Medical Sciences, Bushehr, Iran^c Department of Environmental Health Engineering, Faculty of Health, Bushehr University of Medical Sciences, Bushehr, Iran^d Systems Environmental Health, Oil, Gas and Energy Research Center, Bushehr University of Medical Sciences, Bushehr, Iran^e Department of Natural Resources Bushehr branch, Islamic Azad University, Bushehr, Iran^f Department of Pathology, School of Medicine, Bushehr University of Medical Sciences, Bushehr, Iran^g Young Researchers and Elite Club, Bushehr Branch, Islamic Azad University, Bushehr, Iran

ARTICLE INFO

Article history:

Received 6 September 2016

Received in revised form

9 November 2016

Accepted 15 November 2016

Available online 23 November 2016

Keywords:

Bushehr

Hospital

Inlet wastewater

Metals

Outlet wastewater

ABSTRACT

In this paper, we measured the levels of metals including Pb, Cr, Cd, Ni, Hg, Fe, and Cu in the inlet and outlet wastewater of hospitals. The samples were taken from wastewater in Bushehr's province hospitals, Iran. After the collection of samples, the concentration levels of metals were determined by using graphite furnace absorption spectrometer (AAS) method (Varian, SpectrAA 240, Australia). Statistical analysis of the data was carried out using Special Package for Social Sciences (SPSS 16).

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* Correspondence to: The Persian Gulf Marine Biotechnology Research Center, Boostan 19 Alley, Imam Khomeini Street, Bushehr, Iran. Fax: +98 7514763448.

E-mail addresses: s.dobaradaran@bpums.ac.ir, Sina_dobaradaran@yahoo.com (S. Dobaradaran).

<http://dx.doi.org/10.1016/j.dib.2016.11.054>

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Specifications Table

Subject area	Environment
More specific subject area	Metals
Type of data	Table, figure
How data was acquired	Graphite furnace absorption spectrometer (AAS) method (Varian, AA 240, Australia)
Data format	Raw, analyzed
Experimental factors	All wastewater samples in polyethylene bottles after acidification were stored in a dark place at 4 °C temperature until the metals analysis.
Experimental features	Determine the concentration levels of metals including Pb, Cr, Cd, Ni, Hg, Fe, and Cu.
Data source location	Bushehr province, Iran
Data accessibility	Data is available within this article.

Value of the data

- The data presented here will be useful for the hospital managers for proper treatment and disposal of produced wastewaters in hospital.
- The data shown here may be used for health risk assessment related to hospital wastewater properties.
- Data shown here may serve as benchmarks for other groups working or studying in the field of effluent disposal, pollution control, aquatic ecosystem, and toxicology.

1. Data

The mean \pm SD concentration levels of metals including Pb, Cr, Cd, Ni, Hg, Fe, and Cu in wastewater samples in all hospital inlet samples were 0.53 ± 0.08 , 0.9 ± 0.2 , 0.035 ± 0.008 , 0.86 ± 0.09 , 0.002 ± 0.00 , 1.31 ± 0.51 , and $0.43 \pm 0.1 \mu\text{g l}^{-1}$ respectively. In the case of outlet these values were 0.5 ± 0.04 , 0.77 ± 0.23 , 0.03 ± 0.007 , 0.72 ± 0.08 , 0.001 ± 0.00 , 1.12 ± 0.52 , and $0.37 \pm 0.06 \mu\text{g l}^{-1}$ respectively. As shown in [Table 1](#), total mean concentration levels of metals are always higher in the inlet than in the outlet wastewater. In [Table 2](#), the value removal efficiencies of Pb, Cr, Cd, Ni, Hg, Fe, and Cu in all hospitals shown.

2. Experimental design, materials and methods

2.1. Study area description

Nine hospitals in Bushehr province, Iran were selected as sampling points including Shohadaye Khalije Fars (in Bushehr), Salman Farsi (in Bushehr), Ghalb (in Bushehr), Shahid Ganji (in Borazjan), Mehr (in Borazjan), 17 Shahrivar (in Borazjan), Emam Khomeini (in Kangan), Nabi Akram (in Asaluye) and Tohid (in Jam) (see [Fig. 1](#)). In [Table 3](#), type of wastewater treatment in every hospital is shown.

2.2. Sample collection and analytical procedures

In each hospital, samples were collected from inlet and outlet wastewaters monthly (in total 3 samples from every hospital). In each hospital inlet and outlet wastewaters were taken during the same days by a grab sampling method. Wastewater samples were collected by using 200 mL poly-

Table 1

Contents of Pb, Cr, Cd, Ni, Hg, Fe, and Cu ($\mu\text{g l}^{-1}$) in wastewater samples of hospital (maximum values are expressed as bold italics; minimum values as bold underlined).

Hospital	Pb		Cr		Cd		Ni		Hg		Fe		Cu	
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Shohadaye Khalije Fars	0.59	0.42	1.01	0.53	0.04	0.03	0.95	<i>0.64</i>	0.003	<u>0.001</u>	<i>2.01</i>	1.04	0.48	0.32
Salman Farsi	0.51	0.40	1.02	<i>0.98</i>	0.03	<u>0.02</u>	0.93	0.57	0.002	<u>0.001</u>	1.86	<i>1.06</i>	0.43	0.31
Ghalb	<u>0.41</u>	-	0.69	-	<u>0.02</u>	-	<u>0.69</u>	-	<u>0.001</u>	-	1.98	-	<u>0.25</u>	-
Shahid Ganji	0.51	0.49	0.89	0.46	0.04	<u>0.02</u>	0.87	0.62	0.003	<u>0.002</u>	1.48	0.86	0.45	0.29
Mehr	0.46	<u>0.39</u>	<u>0.53</u>	<u>0.25</u>	0.03	<u>0.02</u>	0.79	0.48	0.002	<u>0.001</u>	0.92	0.43	0.26	<i>0.17</i>
17 Shahrivar	0.57	0.49	1.05	0.74	0.03	<u>0.02</u>	0.93	0.44	0.003	<u>0.001</u>	0.78	0.39	0.44	0.36
Emam Khomeini	<i>0.69</i>	<i>0.53</i>	<i>1.24</i>	0.83	<i>0.05</i>	<i>0.04</i>	<i>0.98</i>	0.61	<i>0.004</i>	<i>0.002</i>	1.32	1.10	0.51	<i>0.38</i>
Nabi Akram	0.58	0.47	0.97	0.48	0.04	<u>0.02</u>	0.89	<u>0.41</u>	0.003	<u>0.001</u>	<u>0.65</u>	<u>0.21</u>	<i>0.58</i>	0.34
Tohid	0.46	-	0.76	-	0.03	-	0.77	-	<u>0.001</u>	-	0.84	-	0.49	-
Mean \pm SD	<u>0.53</u> \pm	<u>0.5</u> \pm	<u>0.9</u> \pm	<u>0.77</u> \pm	<u>0.035</u>	<u>0.03</u>	<u>0.86</u> \pm	<u>0.72</u> \pm	<u>0.002</u> \pm	<u>0.001</u> \pm	<u>1.31</u> \pm	<u>1.07</u> \pm	<u>0.43</u>	<u>0.37</u> \pm
	<u>0.08</u>	<u>0.04</u>	<u>0.20</u>	<u>0.23</u>	\pm <u>0.008</u>	\pm <u>0.007</u>	<u>0.09</u>	<u>0.08</u>	<u>0.00</u>	<u>0.00</u>	<u>0.51</u>	<u>0.34</u>	\pm <u>0.10</u>	<u>0.06</u>

Table 2
Removal efficiencies of Pb, Cr, Cd, Ni, Hg, Fe, and Cu in all hospital (%).

Hospital	Shohadaye Khalije Fars	Salman Farsi	Ghalb	Shahid Ganji	Mehr	17 Shahrivar	Emam Khomeini	Nabi Akram	Tohid
Pb	28.81	21.56	–	3.92	15.21	14.03	23.18	18.96	–
Cr	47.52	3.92	–	48.31	52.83	29.52	33.06	50.51	–
Cd	20	37.5	–	50	37.5	37.5	20	50	–
Ni	32.63	38.7	–	28.73	39.24	52.68	37.75	53.93	–
Hg	66.66	50	–	33.33	50	66.66	50	66.66	–
Fe	48.25	43.01	–	41.49	53.26	50	16.66	67.69	–
Cu	28.81	21.56	–	3.92	15.21	14.03	23.18	18.96	–

Table 3
Type of wastewater treatment in every hospital.

Hospital	Shohadaye Khalije Fars	Salman Farsi	Ghalb	Shahid Ganji	Mehr	17 Shahrivar	Emam Khomeini	Nabi Akram	Tohid
Type of treatment	Activated sludge	Activated sludge	Septic tank	Activated sludge	Activated sludge	Septic tank	Activated sludge	Activated sludge	Without treatment

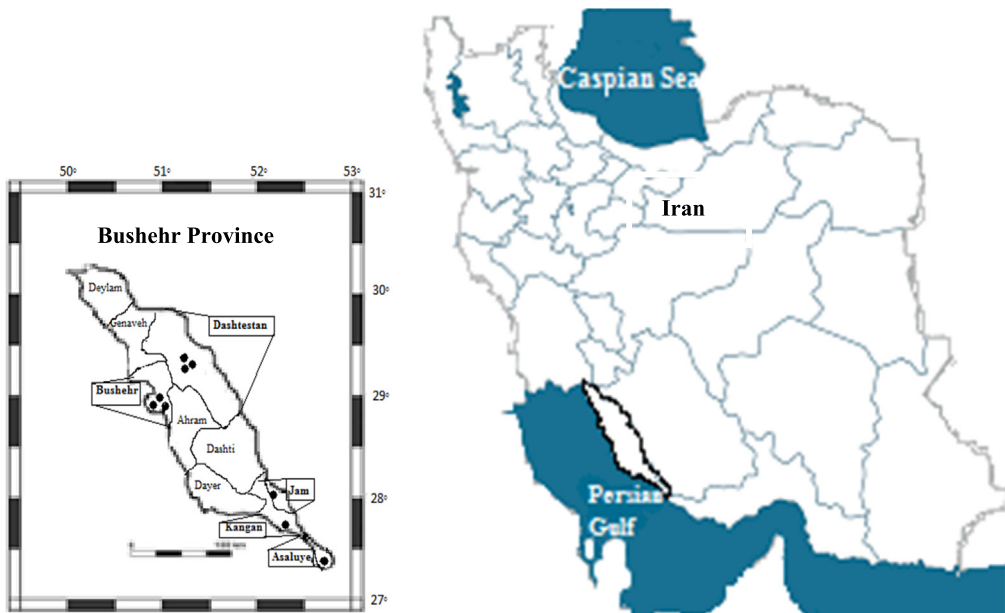


Fig. 1. Location of selected cities in Bushehr province for sampling.

ethylene bottles that were washed three times with deionized water; prior to collecting each sample, and then bottles were labeled with the sample number and location for identification. After transferring to the laboratory, all samples were acidified and stored in a dark place at 4 °C temperature until analysis. The samples were filtered by 0.45 μm Millipore filters. After that, Hg was measured by using cold vapor, and Pb, Cr, Cd, Ni, Fe, and Cu were measured by graphite furnace absorption spectrometer (AAS) method (Varian, AA 240, Australia) [1,2].

Acknowledgments

The authors are grateful to the Bushehr University of Medical Science for financial support. The funder had no role in study design, data collection and analysis, or preparation of the manuscript.

Transparency document. Supplementary material

Transparency data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.dib.2016.11.054>.

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