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Data on pollutants content in the influent and effluent from wastewater treatment plant of Rasht in Guilan Province, Iran

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ABSTRACT

Data on this paper show the concentrations of COD, BOD_5, TSS, K^+, Ca^{2+}, Na^+, Cl^-, NO_3^-, PO_4^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Zn^{2+}, Ni, Pb, Cu and Cd in the influent and effluent of wastewater, and also the nematode eggs, total and fecal coliform in effluents from wastewater treatment plant of Rasht, Guilan Province, in Iran. Measurements of pollutants in influent and effluent was measured according to standard methods (W.E. Federation and Association, A. P. H., 2005) [1]. Statistical analysis of the data was carried out using Special Package for Social Sciences (SPSS 16).

Specifications Table

Subject area	Environmental Engineering
More specific subject area	Pollutants in effluents
Type of data	Figure and table

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How data was acquired	BOD measurement was carried out with a manometer instrument COD, NO_3^-, PO_4^{2+} measurements were carried out using a digital reactor block, and Palintest 5000 colorimeter based on standard procedures. TSS were measured by drying oven. Digital pH meter (Metrohm) was applied for pH analyzing. Electrochemical probes was used for DO measuring Metals and nonmetals measured with ICP and Flame Photometer Total and fecal coliform was measured with membrane filtration technique
Data format	Raw, analyzed
Experimental factors	The data were obtained in two season, summer and winter, and the pH and DO measured in the place other samples from influent and effluent in polyethylene bottles were stored in a dark place at 4 °C temperature until the analysis.
Experimental features	COD, BOD_5, TSS, K^+, Ca^{2+}, Na^+, Cl^-, NO_3^-, PO_4^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Zn^{2+}, Ni, Pb, Cu, Cd, total and fecal coliform and nematode eggs were determined and compared with standard
Data source location	Rasht, Guilan Province, Iran
Data accessibility	The data are available within this paper.

Value of the data

- The data shown here can be used for the wastewater plant managers for proper operation.
- The data will be useful for application of treated wastewater for irrigation of plants and crops or discharge in surface waters.
- The data present here will be valuable for health risk assessment of pollutants for effluent disposal.

1. Data

The data give information about the situation of wastewater quality in the influent and effluent of treatment plant for both season of winter and summer. In addition, it shows the removal efficiency of these parameters after treatment. The mean concentrations of COD, BOD_5, TSS, K^+, Ca^{2+}, Na^+, Cl^-, NO_3^-, PO_4^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Zn^{2+}, Ni, Pb, Cu and Cd in influent wastewater samples were 263.7, 102.1, 82.6, 33, 192, 96, 195.2, 28.7,3.4, 0.4, 0.67, 8, 0.39, 0.3, 0.108, 0.245 and 0.00153 mg/L, respectively. Although in effluent these values were 49.3, 22.7, 35.7, 25, 125, 79, 142, 18.6, 2.25, 0.3, 0.52, 7.9, 0.15, 0.0215, 0.00934, 0.119 and 0.000064 mg/L, respectively. Moreover, the nematode eggs in effluent non- detects and total and fecal coliform in effluents were 273 and 112.5 MPN/100 mL, respectively. As shown in Table 1, total mean concentrations are always higher in the influent than effluent. In Table 2, the value of removal efficiencies for COD, BOD_5, TSS, K^+, Ca^{2+}, Na^+, Cl^-, NO_3^-, PO_4^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Zn^{2+}, Ni, Pb, Cu and Cd in winter and summer are shown.

2. Experimental design, materials and methods

2.1. Study area description

The selected Wastewater Treatment Plant located in Rasht city, Guilan Province, Iran, which the place of it is shows in Fig. 1. The Rasht Wastewater Treatment Plant treats more than 153,000 m^3 of wastewater per day. It is a conventional activated sludge plant consisting of bar screen, grit chamber and the sedimentation tank and activated sludge tank and secondary settling tank. Disinfection was taken by chlorination of effluent.

Table 1
Mean and standard deviation of values of COD, BOD_5, TSS, K^+, Ca^{2+}, Na^+, Cl^-, NO_3^-, PO_4^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Zn^{2+}, Ni, Pb, Cu, Cd, nematode eggs, total and fecal coliform in influent and effluent.

Parameter	Units	Winter		Summer		Standards for discharge to surface waters	Standards for agricultural use
		Influent	Effluent	Influent	Effluent		
COD	mg/L	239.7 ± 47.1	46.1 ± 7.3	287.8 ± 24.7	52.6 ± 4.1	60	200
BOD_5	mg/L	95.5 ± 16.6	20.5 ± 2.4	108.8 ± 38.7	25 ± 6.3	30	100
pH	–	7.6 ± 0.3	7.8 ± 0.3	7.8 ± 0.3	8 ± 0.2	6.5–8.5	6.5–8.4
DO	mg/L	1 ± 0.2	2.6 ± 0.5	1.3 ± 0.3	2.9 ± 0.7	2	2
TSS	mg/L	67.7 ± 10.1	35.3 ± 4.9	97.5 ± 15.5	36.1 ± 3	40	100
EC	ds/m	0.0799 ± 0.008	0.0721 ± 0.008	0.1150 ± 0.01	0.1054 ± 0.009	–	2.97
K^+	mg/L	34 ± 2	26 ± 2	32 ± 4.5	24 ± 3.6	–	–
Ca^{2+}	mg/L	210 ± 15	130 ± 6.2	174 ± 4.5	120 ± 2.6	75	–
Na^+	mg/L	90 ± 6	75 ± 2	102 ± 4.5	83 ± 4.3	–	–
Cl^-	mg /l	124.2 ± 2.1	53.2 ± 0.9	266.2 ± 18.5	230.7 ± 7	600	600
NO_3^-	mg/L	30 ± 7.7	18.2 ± 4.3	27.4 ± 6	19 ± 4.8	50	–
PO_4^{2+}	mg/L	3.5 ± 0.5	2.3 ± 0.3	3.4 ± 0.6	2.2 ± 0.6	6	–
Mn^{2+}	mg/L	0.32 ± 0.01	0.29 ± 0.01	0.48 ± 0.05	0.31 ± 0.04	1	1
Fe^{2+}	mg/L	0.63 ± 0.02	0.46 ± 0.01	0.71 ± 0.07	0.58 ± 0.05	2	2
Mg^{2+}	mg/L	6.8 ± 0.1	6.7 ± 0.1	9.3 ± 0.8	9.2 ± 0.8	100	100
Zn^{2+}	mg/L	0.4 ± 0.01	0.12 ± 0.1	0.39 ± 0.04	0.18 ± 0.03	2	2
Ni	μg/L	29 ± 1	22 ± 1	31 ± 9	21 ± 2	2000	2000
Pb	μg/L	9.48 ± 0.001	8.24 ± 0.001	12.22 ± 0.2	10.44 ± 0.1	1000	1000
Cu	μg/L	190 ± 10	120 ± 10	300 ± 45	118 ± 20	1000	200
Cd	μg/L	0.21 ± 0.01	0.11 ± 0.01	2.86 ± 0.06	1.17 ± 0.03	100	50
Total *Coliform*	MPN/100 mL	–	289 ± 105	–	257 ± 88	1000	1000
Fecal *Coliform*	MPN/100 mL	–	105 ± 24	–	120 ± 57	400	400
Nematode eggs	Number / L	–	0	–	0	–	1 >

Table 2
Removal efficiency of COD, BOD_5, TSS, K^+, Ca^{2+}, Na^+, Cl^-, NO_3^-, PO_4^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Zn^{2+}, Ni, Pb, Cu, Cd from wastewater treatment plant.

Parameter	Removal efficiency (%)	
	Winter	Summer
COD	80.7	81.7
BOD_5	78.5	77
TSS	47.8	62.9
EC	9.7	8.3
K^+	23.5	25
Ca^{2+}	38.1	31
Na^+	16.6	18.6
Cl^-	57.1	13.3
NO_3^-	39.3	30.6
PO_4^{2+}	34.2	35.3
Mn^{2+}	9.3	35.4
Fe^{2+}	26.9	18.3
Mg^{2+}	1.4	1
Zn^{2+}	70	53.3
Ni	24.1	32.2
Pb	13	14.5
Cu	36.8	60.6
Cd	47.6	59.1

Fig. 1. Location of wastewater treatment plant.

2.2. Sample collection and analytical procedures

Experimental period was from January to February as winter and June to August as summer seasons. The 2 weekly samples were collected from both influent and effluent of wastewater treatment plant by a grab sampling method and analyzed based on standard methods for water and wastewaters for COD, BOD_5, TSS, K^+, Ca^{2+}, Na^+, Cl^-, NO_3^-, PO_4^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Zn^{2+}, Ni, Pb, Cu,

Cd, nematode eggs, total and fecal coliform as an important parameters [1–4]. Statistical analysis of the data was carried out using Special Package for Social Sciences (SPSS 16).

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Transparency document. Supporting information

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