

Spatio-temporal variations in physicochemical parameters and the influence of them on accumulation of heavy metals in water and sediments of water treatments basin in a part of Karoun River

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Abstract

Assessment of heavy metals concentrations in aquatic ecosystems can be effective to taking actions to improve the quality of environmental conditions. Therefore, this study was downed to evaluate the heavy metals pollution in water and sediments of water supply points of water treatments in Ahvaz and Mollasani along Karun River and the effect of physico-chemical parameters on these pollutants concentration. For this purpose, six stations were selected along river and from each station; three samples of water and sediment were collected in summer and winter of 2015. After transferring the samples to laboratory and digesting samples, the heavy metals measurement was determined using a flame atomic absorption spectrometry. From SPSS software and statistical tests such as ANOVA, T-test and Pearson correlation were used to analyze the results of metals and parameters in water and sediments. The results showed that the average concentrations of Pb, Zn, Cr and Cd in water were 3.1 ± 0.62 , 4.42 ± 1.04 , 6.2 ± 1.45 and 0.31 ± 0.06 $\mu\text{g/l}$ and in sediments were 19.8 ± 3.7 , 65.9 ± 7.20 , 41.8 ± 6.5 and 2.1 ± 0.25 $\mu\text{g/g dw}$, respectively. The results of One-way analysis of variance (ANOVA) test showed that the mean of metals and physicochemical parameters were significantly different between stations ($P<0.05$). Also T-test statistical analysis showed a significant difference in the concentration of metals and parameters (except DO and size of sediment particles) between the two seasons ($P<0.05$). Investigating the relationship between physicochemical parameters and the metals amount in water of river showed that the different parameters have a different effects on the rate of metals dissolution in water. The relationship between sediment-physicochemical parameters and the metals amount in sediments also showed that the size of sediment particles had no significant effect on spatial distribution and accumulation of metals in sediment, while the percentage of organic matter showed a significant positive correlation with all metals. The findings of study provide useful information on the distribution of physico-chemical parameters and heavymetal concentrations in the Karoun River, which can help monitor and evaluate the region water.

Keywords: Heavy metals, physicochemical parameters, sediment, basin of water treatment.