

Physicochemical and Microbial Characteristics of Ahvaz City Drinking Water in Wet and Dry Seasons in 2023

Hossein Janatshoar¹, Gholamreza Raeesi², Iman Parseh^{3*}

¹Student Research Committee, Behbahan Faculty of Medical Sciences, Behbahan, Iran

²Director of Ahvaz Water and Wastewater Quality Monitoring Center, Ahvaz, Iran

³Department of Environmental Health Engineering, Behbahan Faculty of Medical Sciences, Behbahan, Iran

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*Corresponding Author:

Dept. of Environmental Health Engineering, Behbahan Faculty of Medical Sciences, Behbahan, Iran

ABSTRACT

Introduction: Drinking water for the citizens of Ahvaz is supplied by three rivers: Karun, Karkheh, and Dez. Water quality monitoring in Ahvaz is critical due to numerous polluting factors in the Karun River, high turbidity in flood conditions, increased salinity due to drought, dam construction, and the entry of agricultural wastewater into water sources. Therefore, this study aimed to investigate the physicochemical and microbial indicators of drinking water in Ahvaz City in the wet and dry seasons of 2023.

Methods and Materials: In this study, the drinking water quality of Ahvaz City was monitored from March 21, 2023 to February 19, 2024, in wet (spring and winter) and dry (summer and autumn) seasons. For this purpose, 1,319 water samples were collected from different parts of the city. The microbial quality of drinking water in Ahvaz was assessed using the PA method (presence and absence), and its physicochemical characteristics, including residual chlorine levels, turbidity, temperature, electrical conductivity (EC), and pH, were analyzed at the Ahvaz Central Water Laboratory in accordance with Standard Methods. The results were analyzed using SPSS version 27 software.

Results: The average of residual chlorine, turbidity, temperature, EC, and pH were 0.82 ± 0.12 mg/l, 3.25 ± 1.5 NTU, 24.7 ± 0.6 °C, 1473 ± 643 μ Siemens/cm, 7.6 ± 0.05 , respectively. The maximum amount of these parameters was 1.2 mg/l, 5 NTU, 24.6 °C, 3,590 μ Siemens/cm, and 7.8, respectively. Also, and their minimum amount was 0.4 mg/l, 1 NTU, 24.1 °C, 24.5 μ Siemens/cm, and 7.5 respectively. Also, according to t-test analysis, the average of these parameters in wet seasons were 0.82 ± 0.11 mg/l, 4 ± 1 NTU, 24.6 ± 0.8 °C, 1447.5 ± 723 μ Siemens/cm, and 7.6 ± 0.06 , and in dry seasons, there were 0.82 ± 0.12 mg/l, 2.4 ± 1.6 NTU, 24.9 ± 7.96 °C, 1490 ± 580 μ Siemens/cm, and 7.65 ± 0.05 , respectively. The mean differences were insignificant ($p = 0.05$) except for turbidity ($p = 0.012$). Also, according to microbial analysis, no microorganisms were observed in the samples.

Conclusion and Discussion: The average of all measured parameters was below the permissible set by Iran's national drinking water standard (No. 1053). The relative increase in water turbidity during the wet season, compared to the dry season, may be attributed to the flood conditions of the Karun River. Despite this issue, residual chlorine levels did not differ significantly between the wet and dry seasons, indicating the stability of the disinfection process within the Ahvaz drinking water distribution system. The absence of microorganisms may also be a result of the effectiveness of the water disinfection system. Given that drinking water in Ahvaz is sourced from various locations during flood conditions, regular monitoring of water quality parameters is essential.

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