Bacterial assessment of raw and tap water quality in Basrah city, Iraq

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Abstract

Ensuring drinking water safety is a fundamental public health priority, particularly in cities facing potential environmental risks. This study estimated the microbial and physicochemical water quality of the Shatt al-Arab River and tap water in Basrah city, Iraq. Total bacterial counts, fecal coliforms, pH and electrical conductivity (EC) were monitored in water samples obtained from different sampling points. Fecal coliform identification was carried out on M-FC agar medium incubated at 44.5°C. The bacteriological study revealed a marked geographical variation in the bacterial load. The Shatt al-Arab water samples (especially sample 2) had the highest counts of total bacteria and fecal coliforms (up to 170 CFU/100 ml) indicating direct contact with organic and fecal pollutants. On the other hand, tap water counts indicated lower but very varied contamination levels between 320 CFU/ml in Site 6 and 1200 CFU/ml in Site 7. No fecal coliforms (0 CFU/100 ml) were detected in effluent samples (Sites 3, 4 and 5), indicating the local effectiveness of the chlorination process. Structurally, a drastic fall of pH to acidity and a rise in EC values were recorded in the most polluted zones, demonstrating a strong association between the microbial metabolic activity and the damaged chemical characteristics of water. The results suggest that while chlorination has some effect, the water distribution networks in Basrah require a regular urgent monitoring and advanced treatment technologies to cope with increasing salinity and biological contamination in order to comply with Iraqi and international drinking water standards.

Keywords: Drinking water, total bacteria, fecal coliform, water quality.

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