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Ministry of Higher Education
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Al -Muthanna University
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Using Some Environmental Indices to Assess the Water Quality of Al-Sawyer River at Al-Muthanna Province

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Abstract

The current study was conducted to assess the water quality of the Sawyer River, the main branch of the Euphrates River in Samawa city. Different models of Water Quality Indices (WQI) were considered as effective tools to assess the water quality and suitability for different purposes through measuring some physical and chemical factors and some heavy metals related to water quality. The study involved the selection of three sites located along the Al- Sawyer River, where water samples were collected monthly from the period November 2020 to October 2021.

The results of the study showed that the mean of air and water temperatures ranged between (14-44) °C and (11.66-31.00) °C respectively. The highest mean of electrical conductivity (EC) was 5632 (µS/cm), whereas the lowest mean was 2220 (µS/cm).

The maximum mean of total dissolved solids (TDS) was 3132 (mg/l), while the minimum mean was 931.6 (mg/l). , the highest turbidity mean was 83.25 (NTU), while the lowest mean was 1.26 (NTU). Total suspended solids (TSS) recorded the highest mean was 766.66 (mg/l) while the lowest mean value 13.33 (mg/l).

pH values ranged between (7.26 - 8.83), and the minimum and maximum concentrations of dissolved oxygen (DO) and biological oxygen demand (BOD₅) were (4.8 - 17.73) and (3.33-14) (mg/l) respectively. The total alkalinity, total hardness, hardness calcium, and magnesium values were within the range (135-250.66 , 352-880 mgCaCO₃/L, 160-453.33 mgCaCO₃/L, 27.54-103.68mg/l respectively. The values Nitrite, nitrate and phosphate results ranged (1.03-10.85 µg/L, 2.3-156.4µg/L, 0.12-30.59 µg/L) respectively . The result of Heavy metal concentrations (dissolved phase) for cadmium, lead and zinc ranged (0-24.6 µg/L, 0-157.96 µg/L/l, 0-32.8 µg/L) respectively.

The water quality of the river for drinking, irrigation and aquatic life was assessed according to CCMEWQI , the results showed (41.52, Poor) for drinking, 60.5-93.91 (Fair to Good) for irrigation water, 39.77-79.91 (Poor - Fair) for aquatic life .

According to WA-WQI for the three sites were (237.5, 184.6, 228.6), respectively.

The results of HPI ranged from (17.93-650.8) Medium to high polluted water. On the WQI_{min}, the water can be considered as 36.6-76.6 (Bad –Good) water for aquaculture. whereas the results for WQI_{min}-new (BOD, NO₃, pH) ranged from 63.3-86.6 (Medium-Good) for acidification and organic pollution of water.

The results of the obtained annual mean indices for drinking purpose, according to CCMEWQI indicated (41.52, Poor), as for to WA-WQI for the three sites (237.5, 184.6, 228.6 unsuitable for drinking), respectively, as well the HPI indicated that (238.8, 185.5, 230.2-High Polluted in all site) respectively, and all have shown that the river water is unsuitable for drinking. Suitable used for irrigation and Aquatic life.