Assessment of Water Quality Using Organic Pollution Index in Some Marshes North of Basra Province

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Abstract. The organic pollution index (OPI) was applied to assess the state of the organic pollution in the southern part of Eastern Hammar marsh, Al-Chebiyesh marsh, and the Euphrates and explain the role of submerged aquatic plants in reducing the level of water pollution. Water samples were collected monthly from two stations for each part (i.e., with and without submerged plants). The OPI depended on three parameters, namely, NO_3, PO_4, and BOD_5. Results show that the highest NO_3 was 6.4 mg/L in February in Al Burka, whereas the lowest value was 2.3 mg/L in August in the Euphrates station, which contains submerged plants. The highest PO_4 was 0.76 mg/L in February in Al Burka, whereas the lowest value was 0.24 mg/L in August in Saleh River's station, which contains submerged plants. The highest BOD_5 was 3.63 mg/L in August in the Al Burka station, whereas the lowest value was 0.91 mg/L in February in the Euphrates station, which contains submerged plants. The index values indicate the presence of organic pollution in all stations, with discounts varying between (65.9 and 36.2), (49.9 and 35), and (40.1 and 22) in Eastern Hammar, Al- Chebiyesh, and the Euphrates, respectively. The vital role of submerged plants in the consumption of nutrients reduced the OPI annual values to (44.4, 37.8, and 25.3) compared with the values in stations without plants (54.9, 44.6, 36). The annual values varied between the Deteriorated category in the East Hammar marsh, a Poor category in Al-Chebiyesh, and the Medium category in the Euphrates, with yearly values of 49.7, 41.2, and 30.7, respectively.

Keywords. Basra wetlands, OPI Index, Nutrient, Submerged plants.

1. Introduction

Determining the pollution status is one of the first steps in monitoring and preventing water quality degradation [1]. Surface water quality is being challenged as economic growth, demographics, and climate change lead to widespread and severe degradation. Water is typically considered polluted when anthropogenic contaminants impair it. These contaminants either do not support human use, such as drinking water, or undergo a marked shift in their ability to support their biotic communities [2]. Pollution represents a severe problem in the environment. Organic pollution is used when large amounts of organic compounds are present. Domestic sewage, urban runoff, industrial effluents, and agricultural wastewater arise. In wastewater treatment plants and industries, these pollutants enter the aquatic environment by releasing effluents from these activities [3].

The organic pollution index (OPI) is a comprehensive index that includes more water quality constituents than standard values and combines several pollutants in the same property [4]. Many