Summary:

The study examined the use of the Palmer's algal index and the organic pollution index (OPI) to assess the water quality of the Shatt al Arab river for the period from August 2016 to July 2017. Three stations were selected based on levels of exposure to organic pollution and the presence of submersed surfaces: the first station (Al-Sindibad Island), second station (Al-Bradiea near the presidential palaces) and the third station (Al-Ameia Region in Abu al-Khasib). Samples of water, sediments and periphytic algal were collected monthly during the period of the study. A range of physical and chemical variables were measured, including temperature, electrical conductivity, light penetration, salinity, pH, dissolved oxygen, bio-oxygen requirement, ammonium ion, reactive nitrite, reactive nitrates, reactive phosphates in water and total organic carbon in sediment. The pollution tolerant genera and species belonging to four groups of algae from three station of Shatt Al-Arab River were recorded.

The results showed that water temperature ranged between (11.4-30.2) C°, the values of electrical conductivity ranged between (2.41-6.65) mellisemince / cm, Light penetration ranged between (30-82)cm, Salinity ranged between (1.42-14.9) g/L, the pH values ranged between (7.1-8.9), the dissolved oxygen ranged between (5.9-10.9) mg / l, the biological oxygen demand ranged between (1.1−4.3) mg /l, the current study recorded the concentration of ammonium ion ranged between (0.36-2.31) mg / l, the reactive Nitrite ranged between(0.15-1.72) µg $N\text{-}NO_2$ /l, the reactive nitrate ranged between (11.56-38.56) µg $N\text{-}NO_3$ /l, the reactive phosphate ranged between (0.18-3.75) µg $P\text{-}PO_4$ /l, the values of total organic carbon ranged between (28.2-177.3)mg/g.

The current study showed monthly changes in the values of the organic pollution Index in the three stations. The values ranged from (1.67-0.24), (2.1-0.40) and

(1.74-0.38) for the three stations, respectively. The highest values (2.1) were recorded in August for the second station and the lowest values (0.24) in May for the first station, and thus classified in the seventh categories (bad) and second (good).

Results of Principal Component Analysis (PCA) Showed that (nitrite, nitrates and Biological oxygen demand) were the most effective variables on the levels of OPI, followed by (dissolved oxygen, Water temperature, salinity, electrical conductivity, Reactive Phosphate, Light penetration, total organic carbon and Ammonium Ion). There was no effect of Hydrogen ion on OPI value.

In present study Palmer (1969) Algal genus pollution index and species pollution index were employed to study water quality of Shatt Al-Arab river. The total score of algal genus pollution index at station 1, 2 and 3 were (21), (24) and (21) respectively. While total score of algal species pollution index at station 1 (18), station 2 (21) and station 3 (17) recorded from Shatt Al-Arab river. The total score of each station was greater than 20 indicating the confirmed high organic pollution. Thus it was observed that the higher score for Palmer index at station 2 indicating high organic pollution. As a result the algae from station 2 were polluted water showed the dominance of *Euglena viridis*, *Oscillatoria tennis*, *Synedra ulna* and *Ankistrodesmus falcatus* throughout the year which are considered to be indicator of organic pollution. It was supported by date of physical- chemical analysis of the water which showed high levels of Pollution.

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Thesis Submitted to
College Of Agriculture-University of Basra

As a Partial Fulfillments of Requirements for the degree of Master in Agricultural Sciences, Fisheries and Marine Resources
(Environment and pollution)

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2017 October

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