

DISSOLVED ORGANIC MATTER STATUS IN DAMIETTA
ESTUARY OF THE NILE

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Summary: The seasonal distribution of dissolved organic matter (DOM) in Damietta estuary was investigated to show the effect of organic pollution. The DOM values increased generally with depth. The average values of DOM showed noticeable local variations in each month and pronounced monthly variations at each station. An inverse relationship was found generally between the averages of DOM and those of dissolved oxygen. The direct effect of pollution, in increasing the DOM content in the estuary, decreases towards the sea.

The Nile bifurcates to the northwest of Cairo to its two branches, Rosetta and Damietta, which direct towards the Mediterranean Sea. Faraskour's Dam divides Damietta branch into two different aquatic environments. The freshwater environment in front of the dam and the mostly marine water environment behind the dam till the mouth into the sea. The present study deals with the seasonal distribution of dissolved organic matter (DOM) in the marine area, which represents Damietta estuary, in an attempt to illustrate the influence of organic pollution on this area. Monthly water samples were collected from this estuary during March 1979-March 1980 at five stations, selected along its whole length. Sampling was carried out from three depths at each station.

The values of DOM increased generally with depth, although irregular vertical variations appeared in several months. The vertical DOM values ranged from 0.23-9.97 mgO/l. The increase in DOM values in the bottom of the estuary is due mainly to the increase in the rate of decomposition of the descending plankton (Saad, 1980) and the release of organic matter from the sediments (Abbas, 1980).

The average values of DOM showed noticeable local variations in each month. They varied from 1.18-9.45 mgO/l, giving an obvious difference of 8.27 mgO/l. The increase in the amount of the entering allochthonous organic matter, the increase in the autochthonous organic matter produced within the water body and the decrease in the rate of decomposition of organic matter were mentioned by Saad (1974) to be mainly responsible for the high values of DOM. The average DOM values found at the sites selected nearer to Faraskour's Dam were relatively high in several months, as indicated by the highest regional average values. These are due to the direct effect of pollution. This effect decreases relatively towards the sea, as indicated by the minimum regional average DOM value at the station selected at the mouth of Damietta estuary. This lowest regional average value was accompanied by high dissolved oxygen content,

maximum regional average pH value and depletion of hydrogen sulphide (Abdel-Moati, 1981).

The average DOM values showed pronounced monthly variations at each station. The averages in August (summer) at all stations were noticeably high and gave the maximum monthly average value of 9.05 mgO/l. This coincides mainly with the rise in water temperature (Saad, 1980). However, the minimum monthly average DOM value of 2.37 mgO/l found in December (winter) is due mainly to the drop in temperature. According to Munawar (1970), the rise in temperature accelerates conversion of suspended organic matter into the soluble form. Variations in the amounts of allochthonous organic matter discharged into Damietta estuary are also responsible for the variations of the monthly average DOM values.

An inverse relationship was found generally between the regional averages of dissolved oxygen and DOM and also between the monthly averages of these two parameters. Abbas (1980) observed the same condition in Rosetta branch of the Nile. In addition to DOM, other reducing substances found in the estuarine water are also responsible for the relative decrease in the concentrations of dissolved oxygen (Saad 1974, 1980; Abbas 1980).

References

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