STUDIES ON THE WATER QUALITY OF RIVER RAMISI NEAR A SUGAR FACTORY

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INTRODUCTION:

The ocean due to its extended and volume (1370 X 106 km^3) is considered an ideal disposal site for most of the wastes produced by man. This had led to a grave state of ecological poisoning aggreveated by the long persistence of pollutants in the marine environment. The coastal and estuarine area are places where most ocean dumpings occur and is where most marine life is concentrated. Due to the area being shallow with least mixing there is less dilution of incoming effluents.

River Ramisi flows into the Indian Ocean through Ramisi Sugar factory which empties its untreated effluents into the river. Cases of dead fish have been reported at the estuary during months of January to March and September to December. This study was initiated to study the quality of the water at the estuary where it flows into, which is adjacent to Funzi Bay one of the best fishing grounds for the artisanal fishermen.

MATERIALS AND METHODS

The river was divided into three sampling stations, station A at 2½ km upstream from the factory, Station B, one km after the discharge point downstream and Station C, at the estuary (Fig. I). Modified Winkler method was used. This method introduced the use of sodium azide (NaN_2) to arrest nitrite interference.

Surface temperatures at all stations were measured, salinity was measured using refractometer which was graduated with reading of salinity corresponding to the refractive index, PH was determined with standard PH paper indicator while odour and colour was checked by naked eye.

RESULTS & DISCUSSIONS

At Station A, it was observed that dissolved oxygen decreased with temperature (Fig. 2). The area between the straight line and the curve is the region where extremes of Dissolved Oxygen (DO) should operate unless some pollutants are introduced. The trend at this station is that of unpolluted water system with a DO limit in the region 7 - 9 mg/l. At this Station B, it was observed that DO increased with temperature at a rate of 0.2 mg/l/T. At this station the amount of DO was very low 1.3 mg/l which is most likely not the oxygen from the atmosphere but oxygen generated from organic material in the water. From Fig.

4 there is little increase in DO with increase in temperature which can be attributed to anaerobic/n bacterial activity. This is evident from the fact that there is a foul smell due to hydrogen sulphide (H_2S). At this Station dissolved oxygen was observed to decrease with time (Fig. 5). The annual averages of dissolved oxygen showed that there was a decrease in March, April and May which was due to the rainy season at station A. At station B, low DO averages were observed throughout the year which is explained by the discharge of effluents into the river by the Sugar Factory. The high DO averages in April, May and June observed were due to the fact that the factory was closed for cleaning during this period. In October and November when there is intense factory activity DO is lowest.

There was no significant salinity changes at station A, but with station B, highest salinity changes were in the last quarter of the year mainly due to factory wastes.

In general it can be concluded that River Ramisi is polluted most of the year by the wastes from the Sugar Factory and the Ramisi Sugar Factory authorities should introduce proper treatment of the wastes, before discharging into the river.

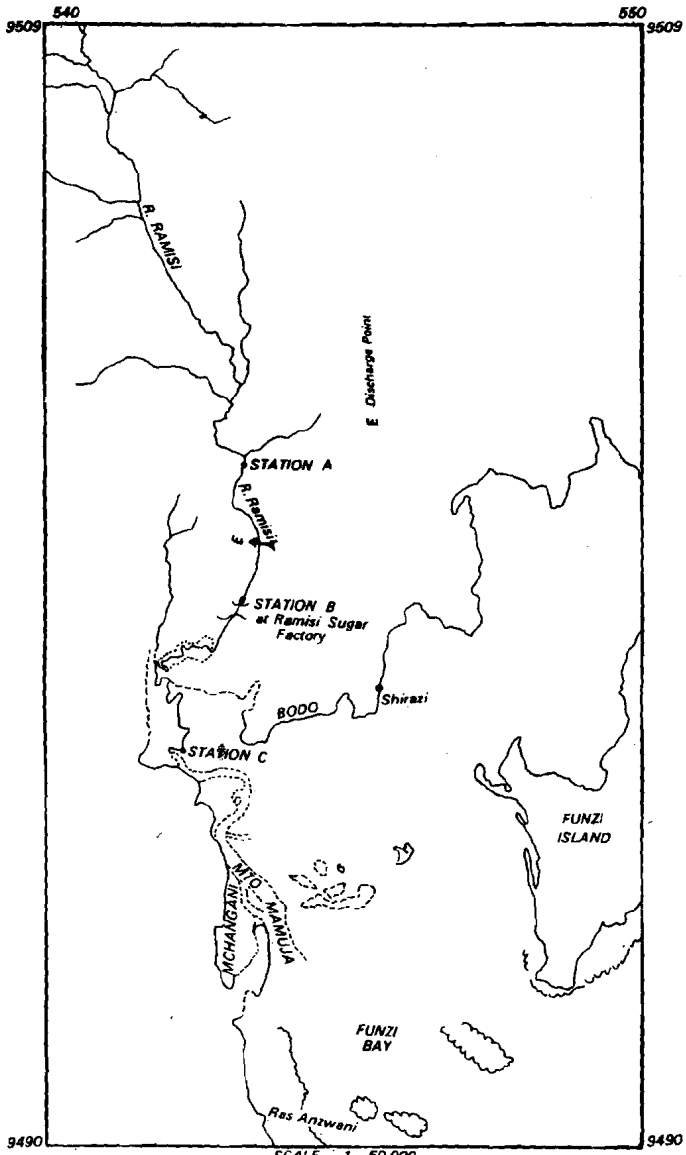

Fig 1. Sketch map showing River Ramisi and sampling stations.

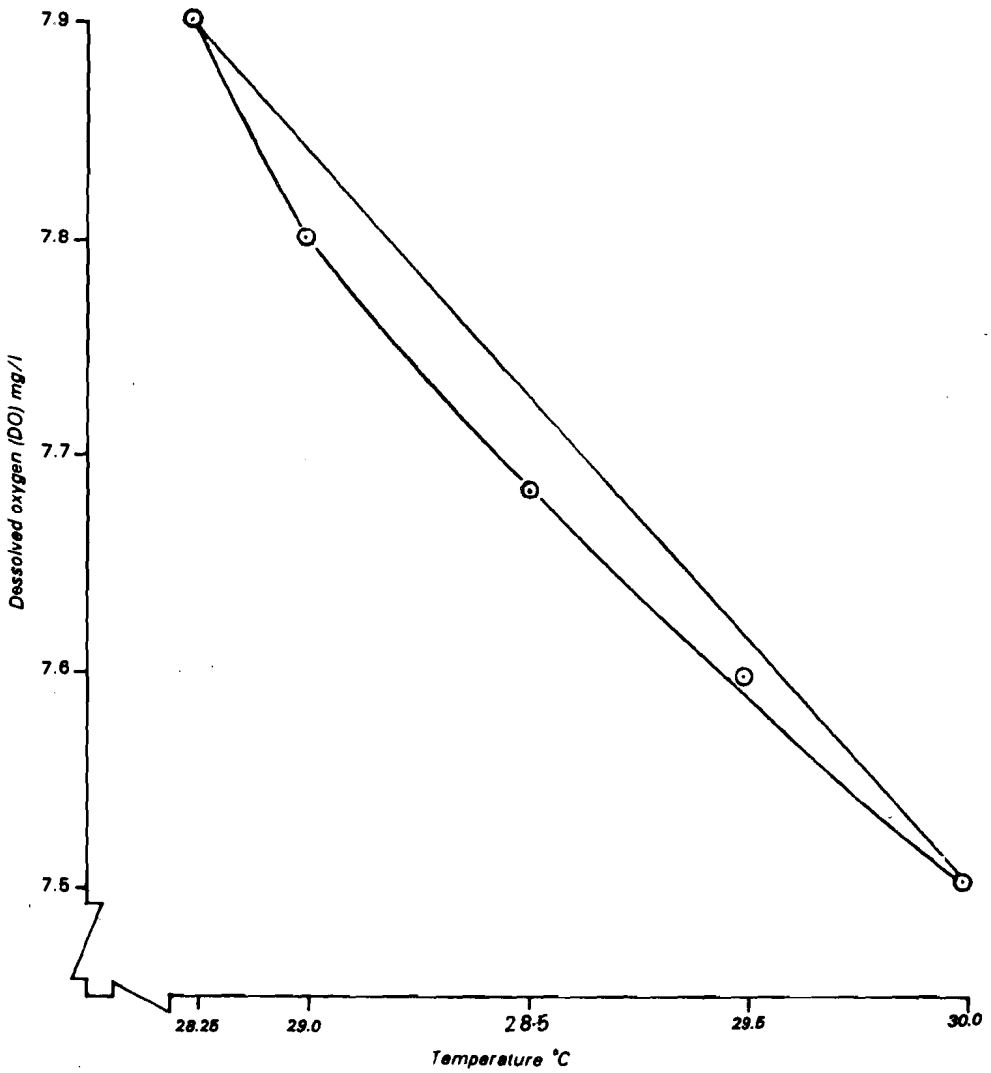

Fig. 2 Variation dessolved oxygen with temperature at Station A.

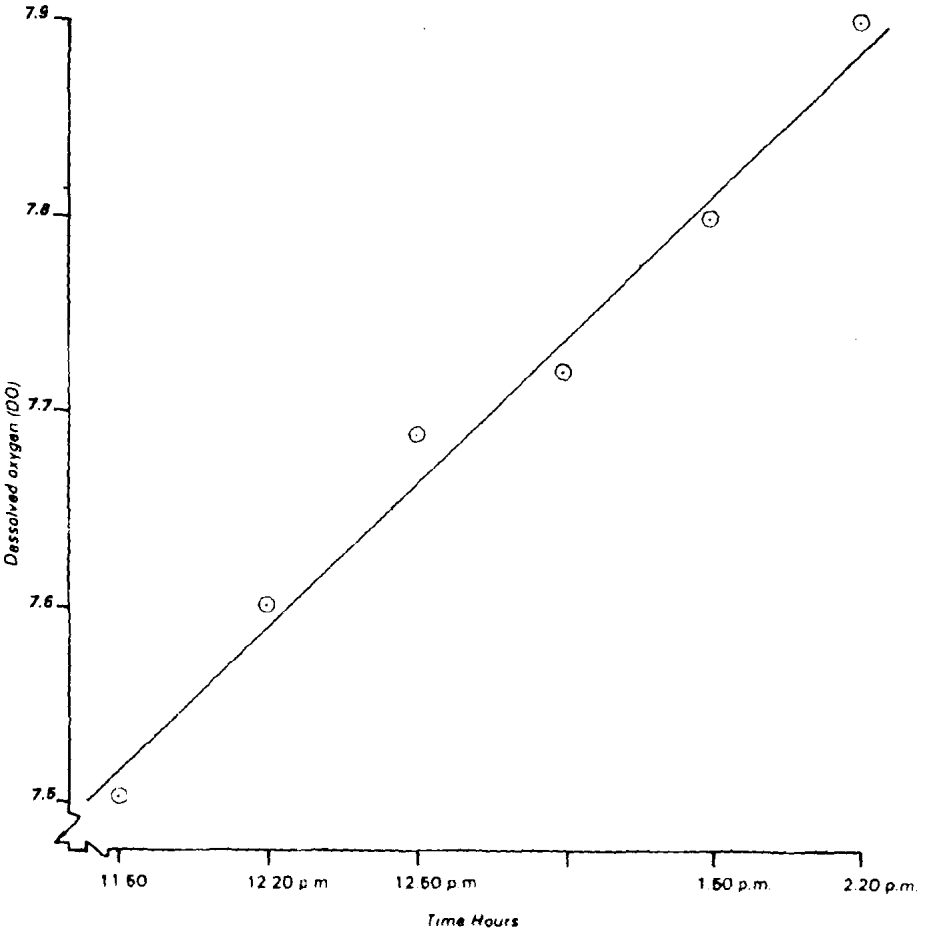

Fig. 3 Variation of dissolved oxygen with time at Station A.

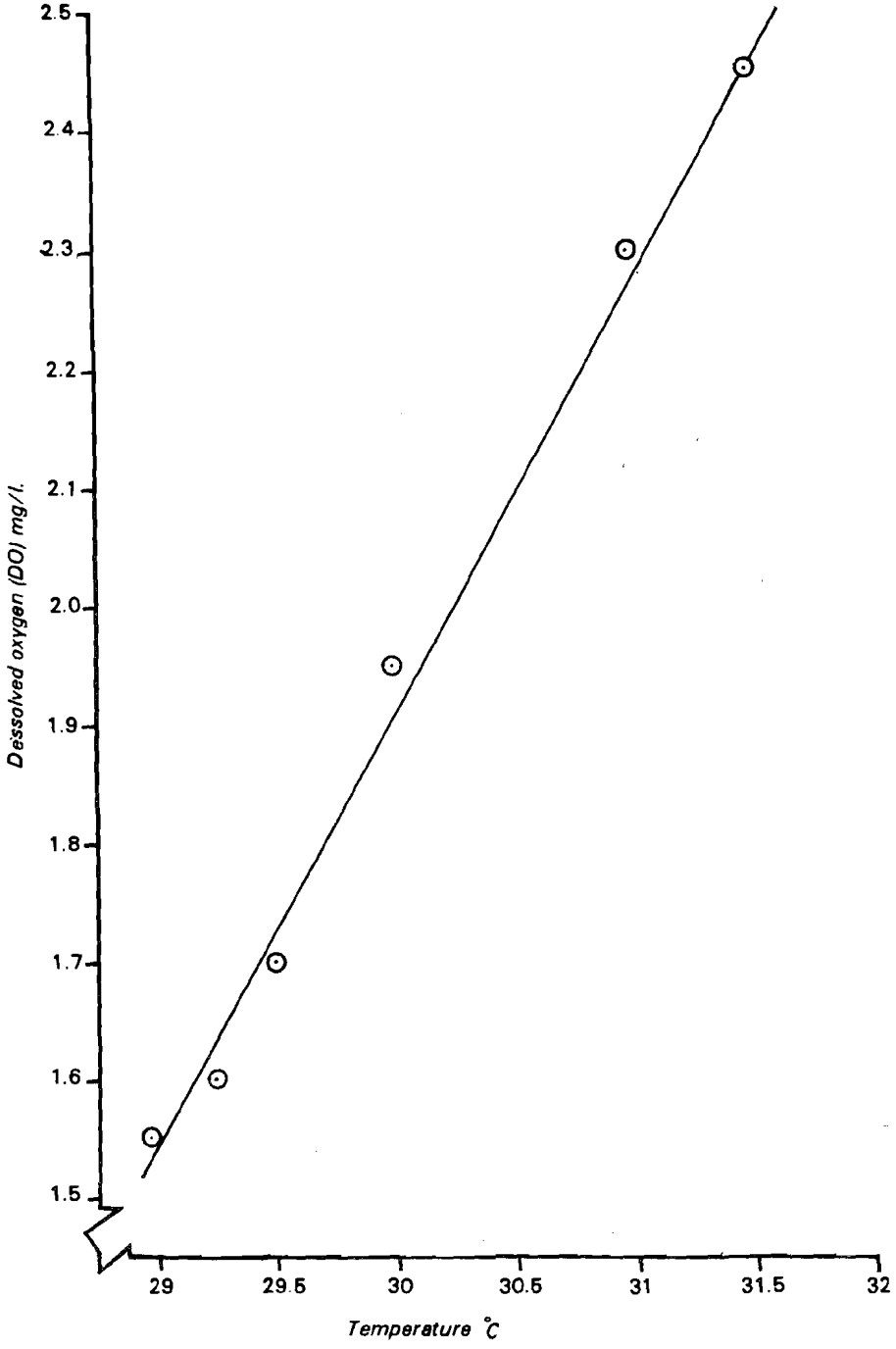

Fig. 4 Variation of dissolved oxygen with temperature at station B

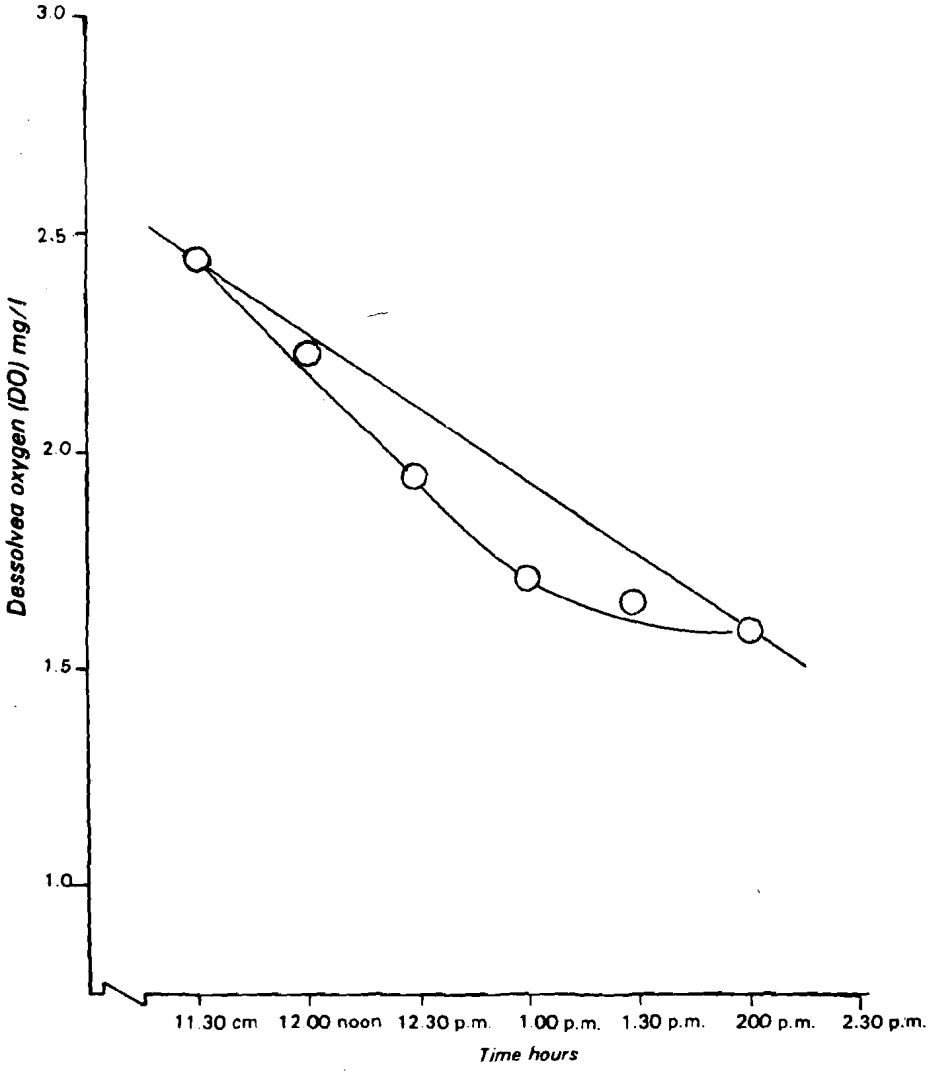

Fig 5 Variation of dessolved oxygen with time at station B