M.S.107. ANIRUDHAN, T.S.–Studies on the Nutrient Chemistry of a Tropical Estuary–1989–Dr. P.N.K. Nambissan.

Studies on the various aspects physiochemical parameters of the estuarine enviornment have received considerable attention in recent years. Such studies help in assessing the quality of water and also provide information on various biogeochemical processes taking place within the estuaries. Estuaries are complex systems, receiving chemical inputs from a variety of sources and the bizzarre variations in the concentration of nutrients during estuarine mixing is addressed as an interesting problem of aquatic chemistry. The behaviour, concentration and distribution of nutrients in estuaries are influenced by numerous factors. Sewage and industrial affluents are knwon to be the prime external sources of nutrients. Under favourable conditions sediment too acts as a reservoir of nutrients and plays a significant part in regulating the nutrient concentration of overlying waters.

The behaviour of nutrients during estuarine mixing may vary from one estuary to another, and even within one estuary it may vary seasonally depending upon the enviornmental conditions such as precipitation, river inflow, biological activity etc. In most estuaries, some of the nutrients may show conservative behaviour while in others these may behave non-conservatively.

The Cochin estuary (09°40'-10°12'N; 76°15'-76°25'E) is a tropical positive estuary on the west coast of India. Like other major estuarine systems the Cochin estuary is also subjected to increasing human impact and is receiving discharges from major industries like Fertilizers And Chemicals Travancore, Travancore Cochin Chemicals, Indian Rare Earths, Cochin Refineries etc. and sewage and storm water through a net work of the large and small canals. Even though there are many refernces in the literature on the hydrographical parameters of the Cochin

estuary, not much is known about the nutrient content of these waters, their variations with seasons, inter-relationship and the physicochemical processes that control them. An over all picture of the estuary and its adjacent sea is still largely lacking.

The work incorporated in this thesis deals with the investigations on the temperature, pH, salinity, dissolved oxygen and nutrients of the waters collected at nine stations in the Cochin estuary over a period of one year (1985 - 1986)

Results on the texture and grain size analysis, seasonal and spatial variation of interstitial, adsorbed and total phosphorus of the sediments collected during the period of survey are also incorporated in this thesis.

The thesis is presented in six chapters. Chapter 1 gives an account of the nutrient behaviour in the estuarine enviornment and their characteristics with a brief review of relevent literature. The scope and aim of the present study are also briefly described.

Chapter 2 gives information on the sampling stations and procedures adopted for the collection of water and sediment samples. Physico-chemical and instrumental methods employed by the author for the analysis of the various constituents are described.

Chapter 3 presents the results of the investigations on the hydrographical parameters viz. temperature, pH, salinity and dissolved oxygen. Seasonal and spatial variations of these hydrographical parameters and their inter-relationship are investigated.

Chapter 4 is devoted to the studies on the dissolved nitrogen of the estuary. Variations in the concentration of different forms of nitrogenous nutrients like nitrite, nitrate and ammonia in the waters are described. The salient features of this study are explained on the basis of the general hydrographical conditions, discharge of domestic and industrial effluents. Regressional behaviour between salinity and the nitrogenous constituents and their inter-relationship are evaluated in order to establish the estuarine fate of the above nutrient.

Chapter 5 deals with the results on the various forms of phosphorus like inorganic reactive, dissolved organic, particulate reactive and total reactive phosphorus concentrations both in surface and bottom waters. High levels of some of these constituents are explained on the basis of estuarine mixing, occurence of pollutional discharges from domestic and industrial effluent plants and adsoption/desorption mechanisms between overlying waters and sediments of the estuary. Variation of interstitial, adsorbed and total phosphorus of the sediments are also discussed in relation to the external characteristics and other parametrs like pH, salinity, dissolved oxygen and reactive phosphorus of the overlying waters.

Chapter 6 describes the chemical behaviour of dissolved silicon in the Cochin estuary; the silicon salinity interrelationship is evaluated and presented.

A summary of the present investigations and reference literature are given at the end.