

DISTRIBUTION OF NITROGEN AND PHOSPHORUS IN
TERENGGANU RIVER ESTUARY

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**DISTRIBUTION OF NITROGEN AND PHOSPHORUS IN
TERENGGANU RIVER ESTUARY**

BY

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ABSTRAK

Taburan nitrogen dan phosphorus di Muara Sungai Terengganu telah dikaji. Kajian sebanyak 2 kali telah dilakukan sebagai memenuhi sebahagian keperluan projek saya. 13 stesen telah dipilih untuk kajian. Sampel air untuk semua stesen telah diambil pada paras permukaan, pertengahan dan dasar.

Persampelan pertama telah dijalankan pada 28 Jun 2002, Jumaat. Min untuk jumlah ammonium bagi stesen sungai, muara dan laut ialah 21.47, 5.41 dan 0.90 μM masing-masing. Sementara untuk jumlah nitrogen terlarut, min ialah 53.35, 37.33 dan 32.63 masing-masing. Min untuk ortofostat ialah 0.18, 0.20 dan 0.22 μM masing-masing manakala min untuk jumlah fosforus terlarut ialah 11.05, 7.83 dan 3.39 μM masing-masing.

Persampelan kedua telah dijalankan pada 7 November 2002, Khamis. Secara umumnya, min untuk jumlah ammonium di stesen sungai, muara dan laut ialah 8.68, 9.65 dan 10.60 μM masing-masing manakala min jumlah nitrogen terlarut ialah 54.37, 57.43 dan 61.55 μM masing-masing. Min ortofosfat di stesen sungai, muara dan laut ialah 0.36, 0.72 dan 0.89 μM masing-masing. Min untuk jumlah fosforus terlarut pula di stesen sungai, muara dan laut ialah 8.40, 9.69 dan 14.32 μM masing-masing.

Semua nutrien yang telah dikaji di sini seperti jumlah ammonium, jumlah nitrogen, ortofosfat dan jumlah fosforus tidak menunjukkan perbezaan ketara ($p > 0.05$) di antara stesen. Jumlah nitrogen dan ortofosfat menunjukkan perbezaan

yang ketara ($p < 0.05$) di antara persampelan pertama dan persampelan kedua tetapi jumlah ammonium dan jumlah fosforus tidak menunjukkan perbezaan yang ketara ($p > 0.05$) di antara tarikh persampelan.

Kepekatan nutrien di dalam air sungai boleh mempunyai pengaruh yang besar kepada tahap nutrien di dalam muara. Pada keseluruhannya, kepekatan nutrien yang terdapat di dalam Muara Sungai Terengganu adalah lebih tinggi jika dibandingkan dengan persekitaran aquatik lain di Malaysia. Tahap jumlah ammonium, jumlah nitrogen terlarut, ortofosfat dan jumlah fosforus yang terdapat di dalam persampelan kedua pada November adalah lebih tinggi daripada persampelan pertama yang dijalankan pada Jun. Ini mungkin disebabkan kemasukan kumbahan dari permukaan tanah semasa hujan monsun yang lebat.

Walau bagaimanapun, tahap nitrogen yang terdapat di Muara Sungai Terengganu adalah lebih tinggi daripada fosforus bagi kedua-dua persampelan. Nisbah N : P untuk persampelan pertama pada Jun adalah dianggarkan 5 : 1 manakala persampelan kedua pada November dianggarkan 6 : 1. Nisbah N : P ini menunjukkan nutrien yang mengehendkan pertumbuhan plankton di Muara Terengganu ialah fosforus.

ABSTRACT

The distribution of nitrogen and phosphorus in Terengganu River Estuary were studied. The sampling stations were visited twice in order to fulfill the requirement as a part of my project. 13 sampling stations were established. The water samples for all the stations were taken at the surface, mid-depth and bottom water.

The first sampling was carried out on 28 June 2002, Friday. The mean values of total ammonium at the riverine, estuarine and coastal water stations were 21.47, 5.41 and 0.90 μM respectively. While for total dissolved nitrogen the mean values were 53.35, 37.33 and 32.63 μM respectively. The mean values of orthophosphate were 0.18, 0.20 and 0.22 μM respectively, and for total dissolved phosphorus the mean values were 11.05, 7.83 and 3.39 μM respectively.

The second sampling was conducted on the 7 November 2002, Thursday. In general, the mean values of total ammonium at the riverine, estuarine and coastal water stations were 8.68, 9.65 and 10.60 μM respectively whereas the mean values of total dissolved nitrogen were 54.37, 57.43 and 61.55 μM respectively. On the other hand, the mean values of orthophosphate found at the riverine, estuarine and coastal water stations were 0.36, 0.72 and 0.89 μM respectively. The mean values of total dissolved phosphorus at the riverine, estuarine and coastal water stations were 8.40, 9.69 and 14.32 μM respectively.

All nutrients being studied such as total ammonium, total nitrogen, orthophosphate and total phosphorus showed no significant difference ($p > 0.05$)

among stations. Total nitrogen and orthophosphate indicated a significant differences ($p < 0.05$) between the first sampling and second sampling whereas total ammonium and total phosphorus reveal no significant differences ($p > 0.05$) between the sampling dates.

Nutrients concentrations in riverine water will have a great influence on the nutrient levels in the estuary. Overall, the nutrient concentrations in Terengganu River Estuary is much higher if compared to other aquatic environment in Malaysia. Higher levels of total ammonium, total nitrogen, orthophosphate and total phosphorus were found in second sampling in November than the first sampling conducted in June. This was probably due to wastes washed down from land during the heavy monsoon rains.

Nevertheless, the nitrogen level in Terengganu River Estuary was much higher than the phosphorus level for both samplings. The N : P ratio for the first sampling in June was about 5 : 1 while second sampling in November was estimated 6 : 1. The major source of nitrogen and phosphorus to this estuary is most probably derived from the sewage pollution. The N : P ratio reveals that the limiting nutrient for plankton growth in the Terengganu Estuary is phosphorus.