NITROGEN AND PHOSPHORUS IN SETIU LAGOON, TERENGGANU

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NITROGEN AND PHOSPHORUS IN SETIU LAGOON, TERENGGANU

By

CHUAH LAI FATT

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PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

Nitrogen and Phosphorus in Setiu Lagoon,Terengganu oleh Chuah Lai Fatt, No. Matrik UK 5658 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Samudera sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains (Sains Samudera), Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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%	-	percentage
^{o}C	-	degree centrigrade
ppm	-	part per million
ppt or ‰	-	part per thousand
mg/L	-	milligram per liter
mm/day	-	millimeter per day
µM	-	micromolarity
µg-at $P.L^{-1}$	-	microgram atom phosphorus per liter
µg-at $N.L^{-1}$	-	microgram atom nitrogen per liter
cm	-	centimeter
g	-	gram
mg	-	milligram
kg	-	kilogram
L	-	liter
mL	-	milliliter
M	-	molarity
N	-	normality
TN	-	total nitrogen
TP	-	total phosphorus
P	-	phosphorus
TA	-	total alkalinity
Ave.	-	average
w/v	-	weight per volume

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ABSTRAK

Taburan nitrogen dan phosphorus di lagun Setiu Terengganu telah dikaji. Kajian sebanyak 3 kali telah dilakukan dari Ogos hingga Disember, 2003. Sebanyak 12 stesen telah dipilih dan dikategorikan sebagai kawasan lagun dan sample air telah diambil pada kedalaman pertengahan disebabkan kecetekan air lagun. Persampelan pertama telah dijalankan pada 7 Ogos 2003, Khamis. Purata kepekatan jumlah ammonium, jumlah nitrogen, orthofostat, jumlah fosforus dan jumlah alkaliniti persampelan pertama adalah 2.73 μM, 17.84 μM, 0.55 μM, 5.88 μM dan 106.67 mg $CaCO_3$/L masing-masing. Persampelan kedua pula telah dijalankan pada 9 Oktober 2003, Khamis. Purata kepekatan jumlah ammonium, jumlah nitrogen, orthofostat, jumlah fosforus dan jumlah alkaliniti untuk persampelan kedua adalah 2.97 μM, 38.57 μM, 0.05 μM, 3.79 μM dan 49.55 mg $CaCO_3$/L masing-masing.Persampelan ketiga pula telah dijalankan pada 3 Disember 2003, Rabu. Kepekatan purata jumlah ammonium, jumlah nitrogen, orthofostat, jumlah fosforus dan jumlah alkaliniti untuk persampelan ketiga adalah 5.60 μM, 51.45 μM, 0.03 μM, 2.82 μM dan 10.62 mg $CaCO_3$/L masing-masing. Jumlah nitrogen, orthofosfat dan jumlah fosforus tidak menunjukkan perbezaan yang ketara ($p>0.05$) di antara stesen. Jumlah ammonium dan jumlah alkaliniti menunjukkan perbezaan ketara ($p<0.05$) di antara stesen. Semua kajian nutrient dan alkaliniti sepert jumlah ammonium, jumlah nitrogen, orthofosfat, jumlah fosforus dan jumlah alkaliniti menunjukkan perbezaan yang ketara ($p<0.05$) di antara persampelan pertama, persampelan kedua dan persampelan ketiga. Secara umumnya, nutrient yang didapati di dalam kajian ini pada persampelan kedua (Oktober) dan persampelan ketiga (Disember) menunjukkan tahap jumlah ammonium, jumlah nitrogen, orthofosfat dan

jumlah fosforus yang tinggi jika dibandingkan dengan lagun yang lain. Walau bagaimanapun, kepekatan nitrogen di Lagun Setiu, Terengganu adalah lebih tinggi daripada kepekatan fosforus bagi ketiga-tiga kali persamplean. Nisbah N:P bagi persampelan yang pertama ialah 3:1 dan nisbah N:P bagi persampelan yang kedua ialah 9:1 serta nisbah N:P bagi persampelan yang ketiga ialah 24:1. Sumber utama nitrogen dan fosforus di sini kemungkinannya datang daripada pembersihan hutan bakau dan air sisa akuakultur.

ABSTRACT

The distribution of nitrogen and phosphorus in Setiu Lagoon, Terengganu was studied. The sampling stations were visited three times from August to December 2003. Twelve sampling stations were established and the water samplers of these stations were taken at mid-depth due to the shallow lagoon area. The first sampling was carried out on 7 August 2003 (Thursday). The average values of total ammonium, total nitrogen, orthophosphate, total phosphorus and total alkalinity during first sampling were 2.73 μM, 17.84 μM, 0.55 μM, 5.88 μM and 106.67 mg $CaCO_3$/L respectively. The second sampling was conducted on the 9 October 2003 (Thursday). In general, the average values of total ammonium, total nitrogen, orthophosphate, total phosphorus and total alkalinity during second sampling were 2.97 μM, 38.57 μM, 0.05 μM, 3.79 μM and 49.55 mg $CaCO_3$/L respectively. The third sampling was carried out on 3 December 2003 (Wednesday). The average values of total ammonium, total nitrogen, orthophosphate, total phosphorus and total alkalinity during third sampling were 5.60 μM, 51.45 μM, 0.03 μM, 2.82 μM and 10.62 mg $CaCO_3$/L respectively. Total nitrogen, orthophosphate and total phosphorus showed no significant difference ($p>0.05$) between stations. Total ammonium and total alkalinity showed significant difference ($p<0.05$) between stations. All nutrient and alkalinity such as total ammonium, total nitrogen, orthophosphate, total phosphorus and total alkalinity indicated a significant difference ($p<0.05$) between the first, second and third samplings. Generally, nutrients that were collected during the second sampling (October) and third sampling (December) indicated higher level of total ammonium, total nitrogen, orthophosphate and total phosphorus compared to other lagoons. Nevertheless, the nitrogen concentrations in Setiu Lagoon,

Terengggganu were still higher than the phosphorus concentrations from all sampling stations. The N:P ratio for the first, second and third samplings were 3 : 1, 9 : 1 and 24 : 1 respectively. The major source of nitrogen and phosphorus here are probably derived from land discharges and aquaculture waste waters.