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Water quality factors related to phytoplankton population changes in the estuary ecosystem: a case study of Mae Klong estuary and Tha Chin estuary, upper Gulf of Thailand

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Abstract The water quality impacts on phytoplankton dynamics in the 3 seasons: winter (January), summer (April) and rainy (September). The total ammonia in the rainy season was significantly higher than in other seasons ($p < 0.05$), the BOD value is significantly higher than other seasons ($p < 0.05$). All four groups of plankton were found, namely blue-green algae, green algae, diatoms, and dinoflagellate, with a total of 40 species. After analysis of the correlation coefficient between the average density of the blue-green algae and the water quality factors showed a high level of correlation ($r = 0.7 - 0.9$) with pH ($r = 0.899$) and BOD ($r = 0.818$), but high concentration of total ammonia ($r = -0.875$) had high level in opposite direction, the diatomic group showed a high level of correlation with the salinity of water ($r = 0.879$) and total hardness ($r = 0.944$), and the dinoflagellate had a high level of correlation with the total ammonia ($r = 0.761$) were statistical significance ($p < 0.05$). It can be concluded that the water quality factors varied in each season which are related to the changes in the quantity of prominent phytoplankton. It proved that in the winter season during the water had high salinity and hardness that found a lot of the diatomic group. While in the rainy season with low salinity but high concentration of total ammonia, found a lot of the dinoflagellate. The blue-green algae positively correlated with BOD value and had a negative relationship with high concentration of total ammonia. Therefore, in the summer which had high ammonia, a lot of blue-green algae are found, but in the rainy season with a high concentration of total ammonia, a small amount of blue-green algae were found.

Keywords: Phytoplankton, Water quality, Estuary, Brackish water

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