Determination of food web in intertidal mudflat of tropical mangrove ecosystem using stable isotope markers: a preliminary study

Abstract

Present study utilized stable isotope markers of carbon-13 (13C) and nitrogen-15 (15N) to indicate existing food web in an intertidal mudflat of Sungai Janggut, Selangor, Malaysia and also the relative contribution of primary producers to the diets of consumers. The δ13C values of algae was -18.69 ± 0.7‰, detritus -24.38 ± 0.9‰, invertebrates -15.25 ± 0.1 to -21.39 ± 0.1‰ and fishes -16.17 to -21.45 ± 0.2‰. The δ15N values of algae was 2.52 ± 0.1‰, detritus 1.53 ± 0.1‰, invertebrates 4.33 ± 0.4 to 8.97 ± 0.5‰ and fishes 9.54 ± 0.3 to 12.81 ± 0.4‰. This showed the assimilation of carbon and nitrogen from variety of sources in mangrove ecosystem. In general, organisms had more positive value of carbon than algae and detritus, indicating a metabolic shift in isotope ratios. This was particular; the average carbon in animal isotope ratio was 0.4‰ and 5.9‰ more positive than mean ratio of algae and detritus. Although there have no obvious systematic trophic enrichment in δ13C, the value of δ15N is good enough to demonstrate the existence of a food web in mangrove ecosystem of Sungai Janggut. Further investigations are needed to gather enough information in order to design an accurate and comprehensive model of the food web in a mangrove ecosystem.

Keyword: Stable isotope marker; δ13C; δ15N; Intertidal zone; Food web