

Heavy metal pollution effects on photosynthetic characteristics of *Fucus vesiculosus* and *Ulva lactuca*

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Heavy metals caused environmental pollution is a world-wide problem in estuarine, coastal and marine waters. Metal pollution affects different organisms in different ways and the degree of the impact is site-specific. In order to assess the metal pollution impact, it is necessary to study the respective chemical and the species concerned. In the present study two species of marine macro algae (*Fucus vesiculosus* and *Ulva lactuca*) and three kinds of heavy metals (Cu, Cd and Pb) were selected. Hence, the aim of the study was to determine the effects of said metals exposure on tissue accumulation, and photosynthetic characteristics (pigmentation and primary productivity) of macro algae under controlled laboratory experiments. Algae were collected from a reference location, Wemeldinge in the Eastern Scheldet Estuary in Netherlands during March 2009. Accumulation of metals in plant tissues was studied exposing two macro algae to three different concentration series (0.00, 0.01, 0.1, 1.0 and 10.0 μM) of Cu, Cd and Pb for 48, 96 and 504 hours respectively. Metal concentrations were determined using Inductively Coupled Plasma Mass Spectrometer (ICP-MS). Productivity of algae was measured using Winkler method (for measuring the amount of oxygen) and the results were expressed as carbon equivalent. Pigment profiles of two species were analyzed by spectral absorbance over 250 -1100 nm range. The results reveal that the metal accumulation in tissues significantly increases with increasing exposure metal concentration whereas, pigmentation, and photosynthetic productivity decrease with increasing metal concentration. Hence, macro algae can be used as indicator organism to determine metal pollution in coastal waters.

Key words: Bio-indicator, heavy metal bio-accumulation, marine macro algae, pigmentation, primary productivity

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