Trace elements in algae: a comparative study

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Trace elements (TE), such as Co, Cu, Fe and Mn act as biolimiting nutrients. Algal species can aggregate heavy metals in their body and can be used as bio-indicators in the polluted ecosystem [1,2]. Here we perform a comparative analysis of the abundance of selected trace elements in the algal samples from Larsemann hills in East Antarctica and compare the result with reports from South and Southeast Asia to identify the natural versus human influence on the TE distribution in algae. Algal and algal mat samples were collected from the eight oligotrophic lakes and associated catchments, respectively, and were digested with acid. The TE (Cd, Co, Cu, Al, Fe, Mn, Ni, Zn, V) analysis was performed using a ICP-AES. The Al, Co, Cu, Fe, Mn, Ni, Zn, V in algal samples vary from 11.8-108.9 ppm, 0.01-0.3 ppm, 0.02-0.1 ppm, 18.0-399.9 ppm, 0.3-3.4 ppm, 0.03-0.3 ppm, 0.07-0.4 ppm and 0.05-0.3 ppm, respectively. In algal mat samples, Al, Co, Cu, Fe, Mn, Ni, Zn, V range from 0.6-98.5 ppm, 0.0-0.1 ppm, 0.0-0.3 ppm, 0.2-364.8 ppm, 0.2-1.3 ppm, 0.1-0.3 ppm, 0.1-0.4 and 0.0-0.2 ppm, respectively. Cadmium is not detected in the samples. Algae show significantly higher Mn values in comparison to the algal mat from the Larsemann Hills area although the values are lower than the anthropogenically affected algal samples from the King George Island of Antarctica and Iran [3, 4]. The Cu, Fe and Ni distribution in Antarctic samples are similar to that of fresh and brackish water algae as reported in experimental studies [5] and algal communities from rivers in northeast India [6]. Further study is ongoing to understand the influence of anthropogenic activities on the mobility and bioavailability trace elements in the algal and algal mat.

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