

Use of seaweeds for monitoring trace elements in coastal waters

Ranjith Jayasekera,
Matthias Roszbach

Abstract

Concentrations of a wide range of trace elements: arsenic, cadmium, cobalt, chromium, hafnium, nickel, thorium, uranium, zinc and the rare earth elements, cerium, europium, samarium, terbium and ytterbium were determined by instrumental neutron activation analysis in the brown alga, *Fucus vesiculosus* from Eckwarder Hörne, North Sea and from Rügen, Baltic Sea. Another brown alga, *Sargassum filipendula* from Sri Lanka, Indian ocean (representing an unpolluted control station) was similarly investigated. Cobalt, chromium and nickel concentrations were highest in *F. vesiculosus* from the North Sea while zinc was highest in samples from the Baltic Sea, reflecting high levels of these elements in coastal waters of the North and the Baltic sea. Cadmium, cobalt, nickel and zinc levels were lowest in *S. filipendula* from Sri Lanka, probably demonstrating lower levels of those elements in coastal waters. Concentration levels of hafnium, thorium, uranium, and the rare earth elements were highest in *S. filipendula*. Two years later in 1994, *S. filipendula* along with *Ulva* sp. (green alga) was resampled from the same sampling site, and in addition to the above elements, six other trace elements (Ag, Ba, Br, Rb, Se and Sr) were determined. *Sargassum filipendula* showed a particular affinity for Ag, As, Br and Sr. For the other elements, marginal concentration differences were observed between *S. filipendula* and *Ulva* sp., probably reflecting the regional background levels. Substantially higher concentrations of Hf, Th, U, and the rare earths were found again in the 1994 *Sargassum* and *Ulva* samples, reflecting the effect of a substrate rich in rare earth elements. The brown algae used in this study may be used to monitor trace elements in coastal waters.