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Elemental concentrations in different species of seaweeds from Loreto Bay, Baja California Sur, Mexico: Implications for the geochemical control of metals in algal tissue

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Concentration levels of 21 elements were analyzed by instrumental neutron activation analysis (Rb, Cs, Ca, Sr, Ba, Sc, Cr, Fe, Co, Ni, Zn, Se, As, Sb, Th, U, Br, Hf, Ta, Zr, and Ag) in seven different seaweed species (Codium cuneatum, Sargassum sinicola, Padina durvillaei, Laurencia johnstonii, L. papillosa, Gracilaria pachidermatica and Hypnea pannosa), collected in a shallow coastal zone from Bahia de Loreto, Baja California Sur, Mexico. Measured concentrations in algal tissue spanned almost eight orders of magnitude (from 2.0×10-3 [mu]g g-1 for Hf to 1.2×105 [mu]g g-1 for Ca). Ca was consistently the most abundant element in all analyzed seaweeds, followed by Fe and Sr. Brown algae showed a tendency to incorporate higher concentrations of elements than red and green algae. Additionally, there were significant linear correlations (P<0.05 to P<0.001) between a total of 76 different pairs of elements, some of them (e.g. Rb-Ni, Rb-Ag, Sc-Cr, Sc-Fe, Sc-Ni, Sc-Hf, Cr-Fe, Fe-Ni, Fe-Hf and Ni-Th) highly correlated (r2>0.900). A significant correlation (r2=0.701, n=18, P<0.001) exists between our measurements in the tissue of algae and their corresponding average elemental concentrations in oceanic water from the North Pacific Ocean. Hence, overall elemental abundance in algal tissue apparently is controlled by the elemental abundance in oceanic water, whereas metabolic processes as well as environmental factors relevant to each region modify the final concentration of a given element in the body of a macroalgae.

Palabras clave: Tendencias espaciales, La Paz, Metals, Bahía de Loreto, Algae, Neutron activation, analysis

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