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Total and bioaccessible fractions of trace elements in cultivated oyster tissues by INAA, PIXE and ICP-MS

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Estimation of the total and bioaccessible fraction of both nutritionally and toxicologically important elements in cultivated oysters consumed by Japanese population groups are of much interest. Oysters are cultivated in Japan by hanging them on an 11-m long rope in the ocean. Levels of 20 elements in these oysters were investigated. Three bunches of oyster were collected at 1, 6, and 11 m depths. From each bunch, five oysters were chosen, washed with tap water, and removed from the shell. Two groups of organ, namely (i) hepatopancreas and muscle, and (ii) gill and mantle, were separated from soft tissues, freeze-dried, and pulverized. One portion of it was irradiated at the Dalhousie University SLOWPOKE-2 reactor facility in Halifax, Canada for assaying Ag, Br, Cl, Cu, Mg, Na, Se, and V by instrumental neutron activation analysis (INAA) through their short- and medium-lived nuclides. Another portion was irradiated at the Kyoto University Reactor in Osaka, Japan for Co, Cr, I, Fe, Rb, Sc, and Zn by INAA using mostly long-lived nuclides. A third portion of the sample was digested in a microwave oven with nitric acid and analyzed for more than 20 elements by particle induced X-ray emission (PIXE). Almost all elements except Cd, Cl, and Ni were found to accumulate in soft tissues with increasing depth. The bioaccessible fraction of the elements was estimated by an in vitro enzymolysis method followed by ICP-MS. Details of experiments and results will be presented.

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