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Concentration Levels of Major and Trace Elements in Rice from Sri Lanka as Determined by the k_0 Standardization Method

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ABSTRACT

Instrumental neutron activation (INAA) with k_0 standardization has been used to determine the concentration levels of a variety of major and trace elements (Al, As, Br, Cd, Cl, Co, Cr, Cs, Cu, Fe, Hg, K, La, Mg, Mn, Mo, Na, Rb, Sc, Se, and Zn) in rice grains (raw and parboiled) and in rice flour collected from local markets in Sri Lanka. In addition, the energy-dispersive X-ray fluorescence (EDXRF) analysis has been used to determine the three elements Ca, P, and S in powdered samples. To evaluate and assure the accuracy and precision of the k_0 standardization method, the IAEA standard reference material V-8 rye flour was analyzed. The results obtained in the present investigation were compared with the results reported from other countries. All of the elements detected in the rice matrices from Sri Lanka were very low in concentration or within normal limits for food plants. Approximate daily dietary intakes of the individual elements supplied through rice were calculated and compared with the available literature values of daily allowances.

Index Entries: INAA; k_0 standardization; neutron activation analysis; rice; trace elements.