

Trace element determination in a mussel reference material using short irradiation instrumental neutron activation analysis

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The production of certified reference materials in Brazil, and the consequent availability to national end users, is an important task for the enhancement of Metrology in Chemistry status in the country, as these materials are used for method validation, equipment calibration and for establishing metrological traceability links. In this study, Instrumental Neutron Activation Analysis (INAA) was applied to the determination of bromine, chlorine, magnesium, manganese, potassium and vanadium in a mussel reference material produced at IPEN - CNEN/SP. For the determination of these elements via the comparative INAA method, the respective analytical radionuclides, ^{80}Br , ^{38}Cl , ^{27}Mg , ^{56}Mn , ^{42}K and ^{52}V , are short lived and then, short irradiations are used. The main advantage over longer irradiation methods is the faster output of analytical results. Six subsamples from two bottles of the *Perna perna* mussel reference material were analyzed. Each subsample was simultaneously irradiated with elemental standards for 10 s at the IEA - R1 research nuclear reactor through a pneumatic transfer system. After suitable decay periods, gamma radioactivity measurements were carried out, using a hyperpure germanium detector. The accuracy of the method was checked by using the NIST SRM 1566b – “Oyster Tissue” certified reference material. The comparison of the results obtained in this study to the robust mean of the interlaboratorial collaborative trial used for the characterization of the mussel reference material was performed via simple z-score tests. The comparison showed that the short irradiation INAA method is suitable for the characterization of new reference materials.