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DETERMINATION OF URANIUM IN TREE BARK SAMPLES BY EPITHERMAL NEUTRON ACTIVATION ANALYSIS

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It is well known that uranium is a toxic element to human beings and it is considered as an environmental pollutant. This element presents accumulative property and can be concentrated on the organs causing various types of diseases. Uranium is widely distributed in the environment, so it is of great interest to improve the method of neutron activation analysis to be applied in its determinations in tree barks used as environmental pollution biomonitor. For analytical quality control of the U results, certified reference materials (CRMs) were analyzed. The tree bark samples were collected from the Tipuana tipu (Tipuana) and Poincianella pluviosa (Sibipiruna) species and, for the analyses the outer layer of the bark was grated and then ground to obtain a powder. Aliquots of CRMs or tree bark samples were weighed in polyethylene envelopes and, irradiated together with U synthetic standard, inside a Cd capsule for epithermal neutron activation analysis (ENAA). The irradiation was performed a pneumatic transfer system at the IEA-R1 nuclear research reactor at IPEN - CNEN/SP. The thermal neutron flux used was of 1.9×10^{12} n $cm^{-2}s^{-1}$ and the irradiation time was of 60 seconds. After adequate decay time, the sample and U standard were measured using a HGe detector coupled to a digital spectrum analyzer DSA 1000, both from Canberra. Uranium was identified by gamma ray peak of 74.66 keV of ^{239}U and half-life of 23.47 minutes. The concentration of U was calculated by comparative method. A total number of five CRMs were analyzed and its results presented relative standard deviations lower than 13.4%, relative errors lower than 3.1% and |Z score| values lower than 0.29. Results obtained in the analyses of tree barks varied from 81.8 to 222.1 ng/g, indicating that U concentrations in the analyzed samples were very low.

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