and, mainly, the use of sophisticated techniques associated with elaborate sample treatments. This work demonstrates the technical viability of using pine needles as bioindicators of nuclear signatures associated with uranium enrichment activities. Additionally, it proposes the use of a technique widely diffused nowadays in the scientific community, the High Resolution Inductively Coupled Plasma Mass Spectrometer (HR-ICP-MS), to identify the signature corresponding to that kind of activities in the ecosystem. It can be also found a description of a methodology recently being applied in analytical chemistry, based on uncertainties estimates metrological concepts, used to calculate the uncertainties associated with the obtained measurement results. Nitric acid solutions with a concentration of 0.3 mol kg^{-1}, used to wash pine needles sampled near facilities that manipulate enriched uranium and containing only 0.1 g kg^{-1} of uranium, exhibit a ^{235}U:^{238}U isotopic abundance ratio of 0.0092 ? 0.0002, while solutions originated from samples collected at places located more than 200 km far from activities related to the nuclear fuel cycle exhibit a value of 0.0074 ? 0.0002 for this abundance ratio. Similar results were obtained for sample solutions prepared by microwave assisted acid digestion and dry ashing process. The different values of ^{235}U:^{238}U isotopic abundance ratio obtained for samples collected in different places permit to confirm the presence of anthropogenic uranium and demonstrate the viability of using this technique and the methodology proposed in this work.

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BRAZILIAN NETWORK OF LABORATORIES ON NUCLEAR FORENSIC SCIENCE (BNLNFS)

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The Brazilian Network of Laboratories on Nuclear Forensic Science (BNLNFS) was created in 2007 with support of IAEA's the Department of Nuclear Security. The main roles of the laboratory are: the development of procedures for characterization of the radioactive or nuclear material in order to determine its production site, production date, intended use, and the route from production site to the crime scene, training and education in nuclear forensics. The network uses a variety of techniques to characterize materials, including nuclear counting, analytical chemistry, radiation measurements, and various radiography techniques. Thus, based on the scientific expertise of IPEN's nuclear scientists and existing infrastructure The network gathers six laboratories located at Nuclear and Energy Research Institute, São Paulo, IPEN's Department of Radiological Protection, and has the support of CNEN's Poços de Caldas Laboratory, Rio de Janeiro, and São Paulo State Police, São Paulo and Federal Police, Brasília. During the exercises, the associated laboratories have to follow all procedures recommended by IAEA to conduct a nuclear forensic investigation.

During the last decade the BNLNF has participated in several international nuclear forensics exercises.

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P35 THE USE OF LASER ABLATION SECTOR FIELD INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY FOR SWIPE SAMPLES ANALYSIS: A VIEWPOINT FROM SAFEGUARD AND NUCLEAR FORENSICS

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This work describes the utilization of laser ablation sector field inductively coupled plasma mass spectrometry (LA-SF-ICP-MS) for determining uranium isotopic composition in a simulated swipe sample by deposition of U_3O_8 powder with natural enrichment level. This method is useful to measure $^{234}U/^{238}U$ and $^{235}U/^{238}U$ isotopic ratios. The measurements were performed on a continuous ablation with low energy density and defocusing, which improved the signal stability, in a cluster of uranium particles. Optimization of measurements was achieved by adjusting the following parameters: RF power, laser beam diameter, defocusing of laser beam, laser energy, laser energy-density, auxiliary gas and sample gas. The $^{235}U/^{238}U$ isotope ratio was 0.00719 $\pm$ 0.00020 and its precision was 1.2 % RSD (relative standard deviation). Uncertainties were estimated following the International Organization for Standardization – Guide to the Expression of Uncertainty in Measurement (ISO – GUM), with a confidence level of 95.45% (k = 2.00). The results indicate that the Laser Ablation ICP-MS technique offers a rapid and accurate alternative for the measurement of uranium isotope ratios in uranium particle. The technique has the added advantage of allowing measurements straight on the sample (without further preparation), preserving the testimony which is very important for safeguards and nuclear forensics purposes.

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