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# APPLICATION OF NEUTRON ACTIVATION ANALYSIS TO THE DETERMINATION OF MERCURY IN HEAD HAIR OF BRAZILIAN POPULATIONAL GROUPS AT RISK OF MERCURY CONTAMINATION

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Much concern has arisen lately in Brazil in the general population, the scientific community and governmental authorities about the contamination of the environment by mercury.

Gold extraction activities in the Central and Northern States of the country, mainly in the Amazonic region, have had serious environmental impact in these regions, since tons of mercury are thrown in the rivers annually or are evaporated in open air after the amalgamation of gold.

In the present work, human head hair has been chosen as the biological monitor to assess mercury contamination, due to its ease of collection and preparation, stability and also due to the fact that it reflects the history of the contamination during a given time period.

Hair samples have been collected, according to the protocol recommended by the International Atomic Energy Agency (IAEA), from twelve Indian tribes living in the Xingu Park, an Indian reservation located in Central Brazil (State of Mato Grosso) and from populations residing in three locations of the State of Amapá (Serra do Navio, Tartarugalzinho and Vila Nova), where gold extraction activities occur.

Instrumental neutron activation analysis has been used as the analytical method for determination of mercury in the hair samples.

The hair samples were first segmented and washed according to the protocol of the IAEA and then submitted, together with suitable mercury standards to a thermal neutron flux of about  $10^{12}$  n.cm<sup>-2</sup>.s<sup>-1</sup>, for a period of one hour. After a decay period of about 70 hours, the samples and standards were measured in a gamma-ray spectrometer, in order to determine the mercury concentrations, via the 77 keV gamma-ray peak of the radioisotope <sup>197</sup>Hg (t<sub>1/2</sub> = 64.1h).

For quality control, the reference materials IAEA Fish Flesh Homogenate (MA-A-2/TM), Chinese Human Hair and IAEA-085 and 086 were analyzed.

It was verified that all the hair samples of the Indian tribes from the Xingu Park analyzed presented mercury concentrations several orders of magnitude higher than those of a control population.

In the case of the populations living in three different locations in the State of Amapá, several subjects also presented high levels of mercury in hair.

The presence of high mercury concentrations in the hair of the Indians could be attributed to their very frequent fish consumption, even though their environment is considered to be still relatively free from mercury contamination.

These regions deserve further study as to the characterization of mercury concentrations in other compartments of the environment, such as water, fish, sediments, aerosols.

This is being already done in the region of the State of Amapá, in a joint project involving several groups in Brazil and financed by a Brazilian Agency (FINEP).

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