BIOMONITORING OF TOTAL MERCURY AND METHYLMERCURY CONTAMINATION OF POPULATION GROUPS LIVING IN THE XINGU PARK INDIAN RESERVATION AND IN THE STATE OF AMAPA, BRAZIL, BY MEANS OF HAIR ANALYSIS

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Human hair has been used extensively for biomonitoring of environmental and occupational exposure to mercury and methylmercury. The value of 50 μ5g.g^{-1} was established by WHO as the minimum threshold value for methylmercury associated with a risk of neurological damage to adults.

Gold exploration activities using mercury amalgamation have caused significant environmental impact in several parts of the Amazonian region, as shown by different studies in which analyses of human hair, fish, sediments, and aerosols have been developed. In the present work, biomonitoring of mercury and methylmercury was done in two main regions in Brazil: the Xingu Park, an Indian reservation located in Central Brazil, and three areas in the State of Amapa (Serra do Navio, Vila Nova and Tartarugalzinho) in the Amazonian region. Xingu Park is considered to be free from mercury contamination and not affected by gold extraction activities, whereas the State of Amapa, especially in Tartarugalzinho, is clearly affected by these activities.

Total mercury was determined in most of the hair samples by instrumental neutron activation analysis, at the Radiochemistry Division of IPEN/CNEN-SP, using the radioisotope ^{197}Hg ($t_{½}$ = 64.1 h; y = 77 keV). Some of the hair samples collected were analyzed for methylmercury also by CVAAS, in the Department of Environmental Sciences of the Jozef Stefan Institute (Ljubljana, Slovenia). Methylmercury was determined by the technique of May et al, in which anion exchange is used for separation of extracted inorganic from organic mercury species.

In all the population groups studied, in Xingu Park and in the three areas of the State of Amapa, the arithmetic means, geometric means, and medians obtained for total mercury were much higher than the controls, and some of them went up to 20 - 30 μg.g^{-1} of total mercury.

The methylmercury content in the hair of six Indian tribes analyzed was 70 to 100% of the total mercury found. It was not possible to determine methylmercury in the hair of the populations living in the State of Amapa, due to the small quantity of hair samples collected.

The results obtained suggest that the population groups studied could be at risk, probably due to the frequent fish consumption that is usual in the Amazonian region. However, in no case did the methylmercury concentrations found exceed the threshold value of 50 μg.g^{-1} set by WHO. Further studies are necessary, including analysis of fish, sediments, and aerosols of both regions studied, to investigate possible sources of mercury contamination. Also it would be interesting to investigate whether early neurotoxical alterations can be observed in these populations, as was reported by Lebel et al in areas on the Tapajos River, for populations showing methylmercury concentrations lower than 50 μg.g^{-1} in hair. (IAEA, FAPESP, CNPq)