KNOW MORE ABOUT: MINERALOGRAM

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Hair analysis is a screening method which aims detecting chronic toxic exposition of heavy metals, and one's nutritional status of minerals. Blood shows what is being carried from one place to the other; urine, shows what was not utilized but excreted; Hair shows what is deposited and stocked in the cells. The hair samples are easy to collect, can be easily stocked, and are not a perishable material. When we want to analyze the status of copper, for example, we can make a biopsy of the liver. When we want to analyze the status of aluminum we can make a biopsy of the brain. On the other hand, when we wish to analyze the status of Calcium we can make a bone biopsy or take out a nail. But it is less invasive to take a hair sample to find out the status of all those metals, for example. The exam can offer-in percentage-the probability of the risk of some diseases, based on a large amount of data, assembled in the last 25 years and from over 1.500.000 exams. Thus, with only one simple exam, we can have a more comprehensive screening test, to establish the need for more specific exams and the ideal criteria conduct, concerning diagnosis and treatment of the patient.

APLICATION OF NEUTRON ACTIVATION ANALYSIS TO THE DETERMINATION OF MINERAL ELEMENTS CONTENTS IN HUMAN HAIR SAMPLES

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The knowledge of mineral elements contents in human hair samples can give valuable information about the health status of individuals and is gaining increasing use as a relevant clinical tool. It is of utmost importance the determination of two main groups of elements in hair samples, in order to obtain the so-called mineralogram as complete as possible the essential and toxic elements. In the first group are included elements such as: calcium, iron, potassium,magnesium, sodium, zinc and selenium.As to the elements that can be considered toxic to humans are, among others: arsenic, cadmium, lead and mercury. Although the contents of these elements in hair are at least a power of ten higher than in blood and urine, they still are present in rangers from ug./kg yo ug/g. so it is necessary to use analytical techniques that are sufficiently sensitive as well as accurate and precise for this kind of determination. The mineralogram is generally obtained with the use of techniques like ICP-AES, that is able to determine 20 essential mineral elements and 8 toxic elements. In the Radiochemistry Division of IPEN/CNEN-SP, neutron activation analysis (NAA) is being applied as an alternative method to obtain data on mineral elements contents in human hair samples. NAA is characterized by a good sensitivity, as well as accuracy and precision and has been extensively applied to analysis of trace elements in biological samples. Hair samples from a control group and also from a group of patients from medical clinis have been analyzed by NAA for the elements Al, As, Br, Ca, Cd, Cl, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Sb, Sc, Se, V and Zn. The results of both groups have been compared, in terms of their geometric means, ranges and medians. For quality assurance of the analytical results, the reference materials NIES No.5 Human Hair and SHINR-HH Human Hair were also analyzed by NAA and there was good agreement with certified values (FAPESP, CNPQ).