P34 CHARACTERIZATION OF NEUTRON SPECTRUM AT THE SHORT IRRADIATION FACILITY OF THE IEA-R1 REACTOR USING THE BARE TRIPLE MONITOR METHOD

J.P.O. Flores[a] and R. Semmler

[a] joaooflo@gmail.com

Nuclear and Energy Research Institute, São Paulo, Brazil

The neutron spectrum parameters were determined in the short irradiation facility of the IEA-R1 reactor of IPEN. The neutron spectrum parameters are: the epithermal neutron flux shape factor (α) approximated by a $1/E^{1+\alpha}$ distribution and the thermal to epithermal neutron flux ratio (f). According to the HOGDAHL formalism, the k_0-NAA method uses the following input parameters: the full energy peak detection efficiency (ε_p), and nuclear data on Q_0 (ratio of resonance integral I_0 to thermal neutron cross-section σ_0) and k_0 factors. The α and f parameters depend on each irradiation facility and ε_p depends on each counting facility. In the HOGDAHL formalism the reactor neutron spectrum parameters (α and f) can be obtained using three methods: Cd-ratio, Cd-covered and bare triple monitors. In this work α and f were determined by the bare triple monitor method. In this method, a set of three neutron flux monitors are irradiated without Cd-cover. The efficiency curves of the gamma-ray spectrometer used were determined by measuring calibrated radioactive sources at the usually utilized counting geometries.

P48 USE OF MACROPHITES FOR REMOVAL OF METALS IN LIQUID EFFLUENTS, USING INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS

J.A.S. Oliveira[a] and P.S.C. Silva

[a] joliveira@ipen.br

Nuclear and Energy Research Institute, São Paulo, Brazil

This study proposes the application of Eichhornia crassipes biomass, abundant in the dams of São Paulo state, to remove metallic ions from solution, aiming its application to effluent treatment. The efficiency of adsorption was tested by the Zn, Fe, Cr, Co removal from solutions containing these elements. The plants, for biomass production, were collected at the Billings reservoir in São Bernardo do Campo, located in the Southeast of São Paulo Metropolitan Region. After collection, the plants were washed and dried in a ventilated oven from 60°C to 70°C, crushed and passed through a 150μm sieve. The biomass thus obtained was subjected to the chemical activation process by the treatment with 0.1 mol L^{-1} solution of HCl and 0.1 mol $^{-1}$ of NaOH in order to increase its surface area. The tests indicated that the treatment with HCl was the most effective and this was used in the preparation of the biomass for the adsorption tests of the metallic ions. The adsorption tests were carried out, at first, to verify the effect of the pH and the contact time between the sample and the adsorbent in the adsorption process. The concentrations

of Zn, Fe, Cr and Co, present in the solution, before and after the treatment, were determined by the instrumental neutron activation analysis (INAA) technique. For this determination the samples were irradiated for 8 hours at the IEA-R1 reactor at IPEN. The concentrations were determined by comparing the peak area of the samples and that of the reference materials irradiated together with the samples.

DIFFERENCES IN IRON CONCENTRATIONS IN WHOLE BLOOD OF ANIMALS MODEL USING NAA

P49

L.F.F.L. Silva[a], C.B. Zamboni, V. Bahovschi, S. Metairon and I.M.M.A. Medeiros

[a] **laisdefatima.ferreiralopes@gmail.com**

Nuclear and Energy Research Institute, São Paulo, Brazil

In this study Neutron Activation Analysis technique (NAA) was applied to determine Fe concentrations in whole blood samples of several animals model: mice (Mus musculus), Golden Hamsters (Mesocricetus auratus), Wistar rats, Albinic Rabbits of New Zealand, Golden Retriever dogs and Crioula breed horses. In the health area these animals model are used for several investigations, mainly those that involve testing of new medicines, vaccines, antibiotics, anesthetics, antidepressants, organs transplantation as well as medical diagnostic studies. While small-sized animals model (mice, hamsters, rats and rabbits) are very convenient to perform medical investigation due to the low cost, easy handling and medico-legal implications, medium and large sized animals, (mainly Golden Retrievers dogs) are selected for medical diagnostic studies because of their physiological similarities with the humans. Particularly, in this study, horses (Crioula breed) were also investigated because they are frequently used for antivenom production in Brazil. An important aspect to be considered during these medical investigations is the needs to check for similarities between the animal's blood and the human's blood. Besides, considering that Fe plays important functions in blood (acts as indicator of a great number of anomalies) consulting these data is possible to select the convenient animal model for experiments which the similarities with the humans are an important condition. The NAA measurements were performed in the nuclear reactor IEA-R1 (3.5-4.5MW, pool type) at IPEN/CNEN-SP (Brazil). Fe concentrations results in the blood of these animals were compared with human blood estimative and some significant differences were identified.
