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

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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.

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

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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 150 μ m 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 L⁻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