NATURAL AND ARTIFICIAL NUCLIDES IN SALESÓPOLIS RESERVOIR BY GAMMA SPECTOMETRY P78

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Natural radioactivity is ubiquitous in the environment mainly due to the presence of the nuclides from the uranium and thorium series and K-40 in soil, water and sediments. Although in the South Hemisphere nuclear tests have been fewer in number than that in the North, artificial radionuclides can also be found spread at ground level. Salesópolis is located in the Metropolitan Region of São Paulo city (SPMR). The Usina Parque Rio Tietê (Salesópolis) reservoir belong to the Alto do Tietê system for the capture, storage and treatment of water for the São Paulo Metropolitan Region (SPMR). Therefore, the quality of the water, as well as, of sediments of this dam is of great importance. In this study, the activity concentrations of the natural uranium and thorium nuclides series, K-40 and the artificial Cs-137 were determined in a sediment core (T1B) with 42cm depth and sliced each 3 cm totalizing 14 samples, collected in the middle of the Salesópolis dam. Samples were sealed and wait 30 days for the radioactive equilibrium to be reached. The activity concentrations were measured by gamma spectrometry. Samples were counted and saved at regular intervals at a maximum of 160 000 seconds. The gross area were calculated for each peak and plotted against time and the counting rate was obtained by the sloop of the curve. The background and reference materials were treated in the same way. Results showed that ^{228}Th varied from 44 to 150 $Bq\ kg^{-1}$; ^{228}Ra, from 49 to 149 $Bq\ kg^{-1}$; ^{226}Ra, from 26 to 88 $Bq\ kg^{-1}$; ^{210}Pb, from 93 to 247 $Bq\ kg^{-1}$; 40K, from 127 to 852 $Bq\ kg^{-1}$ and ^{137}Cs varied from 0.2 to 6.7 $Bq\ kg^{-1}$

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INFLUENCE OF PYROLYTIC TEMPERATURE ON URANIUM ADSORPTION CAPABILITY BY BIOCHAR DERIVED FROM MACAUBA COCONUT RESIDUE P87

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Biochar (BC) is a carbon-rich product obtained when biomass is thermally decomposed at relatively low temperatures (under 700°C) and limited supply of oxygen in a process called pyrolysis. The conversion of biomass into BC can not only result in renewable energy source of synthetic gas and bio-oil, but also decrease the content of CO_2 in the atmosphere, as well as improving soil fertility. Because of its porous

structure, charged surface and surface functional groups, BC exhibits a great potential as an adsorbent. Brazilian agro energy chain involves tons of biomass waste, providing a wide range of biomasses with different chemical and physical properties. BC characteristics strongly depend on the feedstock and the pyrolysis conditions, in which the temperature is the key parameter. The aim of this study was to evaluate the adsorption potential for the removal of uranium, U(VI), from aqueous solutions using BC obtained through the pyrolysis of the macauba (Acrocomia aculeata) coconut endocarp as a function of the final pyrolytic temperature. BCs produced at higher temperatures are likely to present lower H/C and O/C ratios, indicating the loss of easily degradable carbon compounds such as volatile matter. In contrast, low-temperature pyrolysis produces not only a higher BC yield, but also richer in surface functional groups which will likely enable interactions with the U(VI) ions. The endocarp was subjected to six different pyrolytic temperatures, ranging from 250°C to 750°C. The influence of parameters such as pH, sorbent dose and initial concentration on the adsorption of U(VI) was investigated. The maximum adsorption capacity (q) was achieved for the BC obtained at 250°C (BC250), which presented a removal percentage of approx. 86%, demonstrating the potential of the BC from macauba endocarp for treatment of wastewaters. Thus, submitting the endocarp to temperatures higher than 250°C becomes unnecessary, saving time and reducing operating costs.

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