

Chemical and Mineralogical Composition of Peruíbe Black Mud

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Peruíbe Black Mud is used in therapies such as psoriasis, peripheral dermatitis, acne and seborrhea and, also, to myalgia, arthritis and processes non-articular rheumatic. This material is characterized by its fine particles content, high organic matter, high sulfate reducing bacteria content and reduction potential. Although this material has been used by the public health system in Peruíbe City, São Paulo State, in Brazil, its elemental composition and mineralogical characteristics are still not well known.

Samples of Peruíbe Black mud were analyzed by neutron activation analysis to determine its elemental composition. Elements As, Br, Co, Cr, Cs, Fe, Hf, Rb, Sb, Ta, Th, U, Zn and rare earths (Sc, Ce, Eu, La, Lu, Nd, Sm, Tb and Yb) were determined. Approximately 150 mg of sediment samples and standard reference materials (SRM) were accurately weighed and sealed in pre-cleaned double polyethylene bags for irradiation. Samples and SRM were irradiated for 8 h in a thermal neutron flux of 10^{12} n cm⁻² s⁻¹ in the IEA-R1 nuclear research reactor at IPEN. Two series of counts were made: the first, after a one week decay period and the second count after 15–20 days.

Sample mineralogy was identified by X-ray powder diffraction (XRD) using a Siemens automated powder diffractometer equipped with a graphite monochromator, and Cu K α radiation at 40 kV and 40 mA. All samples were scanned in the 2θ range of 2–60° with a step size of 0.020°, using Cu K α radiation at 40 kV and 40 mA. Three X-ray patterns were recorded: at air-dried condition, after solvation with ethyleneglycol for 24 h, and after heating, at 550 °C for 3 h.

The amount of moisture, organic carbon and loss of ignition were determined in a furnace oven at temperatures of 105°C for 24h, 550°C for 2h and 1000°C for 2h.