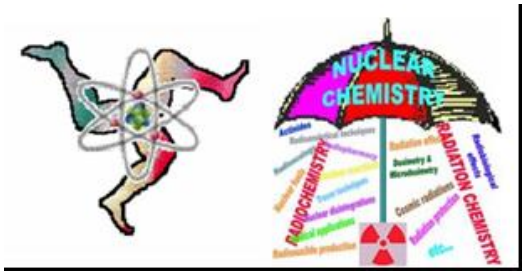

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Rare earth elements in phosphogypsum and phosphate fertilizers in Brazil

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The Brazilian phosphate fertilizers are obtained by wet reaction of the igneous phosphate rock with concentrated sulphuric acid, giving as final product phosphoric acid and dehydrated calcium sulphate (phosphogypsum - PG) as by-product. The level of impurities (metals and radionuclides, among others) present in the phosphate rock used as raw material is distributed among products and by-products. In Brazil, PG has been used for many years in agriculture as a soil amendment. The characterization of natural radionuclides and heavy metals in PG has been extensively studied by several authors. In this paper, the concentration of rare earth elements - REE (Ce, Eu, La, Lu, Nd, Sm, Tb and Yb) present in Brazilian phosphogypsum and the most used phosphate fertilizers (single super phosphate (SSP), triple super phosphate (TSP), monoammonium phosphate (MAP) and diammonium phosphate (DAP)) were determined by instrumental neutron activation analysis - INAA. In order to evaluate the availability of these elements to the soil and plants, the PG samples were extracted with water and a solution of EDTA- NH4 0.05M (procedure established by the European Community) and the REE in the leachate were determined by INAA. REEs concentrate preferentially in PG and the fertilizers TSP and SSP. The results obtained using the methodology with mild leaching of PG with EDTA and total dissolution in water showed that the REEs are not extracted from the PG, and therefore are not available to the environment.

Primary author: Dr MAZZILLI, Barbara Paci (Instituto de Pesquisas Energeticas e Nucleares)

Co-authors: Dr SAUEIA, Catia H. R. (Instituto de Pesquisas Energéticas e Nucleares); Dr FÁVARO, Deborah I. T. (Instituto de Pesquisas Energéticas e Nucleares)

Presenter: Dr MAZZILLI, Barbara Paci (Instituto de Pesquisas Energeticas e Nucleares)

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