

12th International Conference on Modern Trends in Activation Analysis

16 - 21 September 2007
Tokyo Metropolitan University
Hachioji, JAPAN

organized by

Japan Association of Activation Analysis (JA3)

co-hosting organizations

American Nuclear Society
Atomic Energy Society of Japan
International Atomic Energy Agency
The Chemical Society of Japan
The Geochemical Society of Japan
The Japan Society for Analytical Chemistry
The Japan Society of Nuclear and Radiochemical Sciences

supported by

The Kao Foundation for Arts and Sciences
CASIO Science Promotion Foundation
The Watanabe Memorial Foundation for the Advancement of Technology

P055

CHARACTERIZATION AND PHYTOAVAILABILITY EVALUATION OF MICRONUTRIENTS AND CONTAMINANTS IN SOME BRAZILIAN PHOSPHATE FERTILIZERS

M.J.A. Armelin¹, A.R. Trevizam², C.H. Abreu Jr.², and M. Saiki^{1*}

¹*Instituto de Pesquisas Energéticas e Nucleares, IPEN-CNEN/SP, ²Centro de Energia Nuclear na Agricultura, CENA/USP*

*¹Instituto de Pesquisas Energéticas e Nucleares, Av. Prof. Lineu Prestes 2242, CEP 05508-000, São Paulo, SP, Brazil, (mitiko@ipen.br)

Brazilian fertilizer legislation considers the total concentration of micronutrients as being the guarantee of their presence in fertilizers. This fact allows to use industrial by-products as micronutrient source for fertilizers, which brings the risk of presence of high amounts of toxic elements that may lead to soil contamination, affecting harvest and the quality of the products. The purpose of this study was to determine the micronutrient and contaminant contents in 6 Brazilian commercial phosphate fertilizers and to evaluate the phytoavailability of the following elements: As, Br, Cd, Co, Cr, Eu, Fe, La, Mo, Na, Sb, Sc, Sm, Th and Zn from soils treated with these fertilizers. The phytoavailability was evaluated analyzing elements absorbed in aerial part of rice plants (*Oryza Sativa*), IAC cultivar 202. The green house experiment was used for cultivation in two types of soils Typic Quartzipsamment (TQ) and Typic Oxisols (TO). Instrumental neutron activation analysis (INAA) followed by gamma-ray spectrometry was the analytical method used to determine element contents. Element concentrations in vegetal tissue for most elements were not modified by the treatment. However, the statistical analysis showed a significant absorption of Cd by the vegetal tissue, probably due to treatment with fertilizers. Significant differences were also verified in element contents determined in plants cultivated in TQ and TO soils.

P056

CHEMICAL CHARACTERIZATION OF AGRICULTURAL SUPPLIES APPLIED TO ORGANIC TOMATO CULTIVATION

T.C.G. Martins*, E.A.N. Fernandes, A.A. Ferrari, F.S. Tagliaferro, M.A. Bacchi

Centro de Energia Nuclear na Agricultura, Universidade de São Paulo

*P.O. Box 96, 13400-970 Piracicaba, SP, Brazil (tmartins@cena.usp.br)

Organic agriculture emerged as an alternative to the current intensive model of production, in view of offering food of superior quality and free of contaminants. The control of pests and diseases as well as fertilization of soil are processed with alternative agricultural supplies as production inputs. Although organic agriculture considers these inputs beneficial to plants and innocuous to human health, the safety of their use is not yet fully demonstrated. Considering the agricultural supplies as significant source of chemical elements to plants, samples of cattle manure, Ecosolo[®] compost, Trichonat PM (*Trichoderma* spp.), rice bran, ground charcoal and oyster flour, extensively used in the organic tomato cultivation, were analyzed by instrumental neutron activation analysis (INAA). Sampling was carried out in a farm located in Araraquara city, São Paulo state, Brazil. The farm holds the organic certification issued by Instituto Biodinâmico (IBD), which is accredited by the International Federation of Organic Agriculture Movements (IFOAM). After drying and particle size reduction, 400 mg analytical portions of samples and certified reference materials (for quality control) were evaluated by INAA for determination of 18 chemical elements. The oyster flour presented high concentrations of Ca and Na. Considerable concentrations of As, Co, Cr and Zn were found in samples of Trichonat PM, cattle manure and Ecosolo[®] compost. All values, except Cr, were below the maximum limits established by the Brazilian Environment Sanitation Agency (CETESB) in a directory report orienting values of toxic elements in soils and groundwaters of São Paulo State.

98169

12459