

DETERMINATION OF k_0 AND Q_0 FOR $^{113}\text{In}(n,\gamma)^{114}\text{In}$ REACTION WITH COVARIANCE ANALYSIS

P54

L.F. Barros^a, M.S. Dias, M.F. Koskinas, I.M. Yamazaki, R. Semmler and R.V. Ribeiro

^a liviabarros4@gmail.com

Nuclear and Energy Research Institute, São Paulo, Brazil

The use of k_0 method for quantitative reactor Neutron Activation Analysis (NAA) is a well-known technique for determining multi-element concentrations in different materials. In order to achieve good results, there is a continuing need for improving the accuracy of k_0 and Q_0 parameters for several neutron capture reactions. $^{113}\text{In}(n,\gamma)^{114}\text{In}$ reaction can be considered particularly interesting because k_0 and Q_0 discrepancies appear in the literature. This fact motivated the present work which is focused on the measurement of k_0 and Q_0 values for this reaction with the purpose of improving the existing data catalogues. The irradiations were performed near the core of the IEA-R1 4.5 MW swimming-pool nuclear research reactor of the Nuclear and Energy Research Institute (IPEN-CNEN/SP), in São Paulo, Brazil. The distribution of epithermal neutron flux α in the IEA-R1 is close to zero at the chosen irradiation position, which favors to obtain Q_0 accurately. Two irradiations were carried out in sequence using two sets of samples: the first with a cadmium cover around the samples and the second without. The activity measurements were carried out in an HPGe gamma-ray spectrometer. Standard sources of ^{152}Eu , ^{133}Ba , ^{60}Co and ^{137}Cs supplied by the IAEA were used in order to obtain the HPGe gamma-ray peak efficiency as a function of the energy. The covariance matrix methodology was applied to all uncertainties involved. The final values for k_0 and Q_0 were compared with the literature.

This work was presented at 1st International Conference on Radioanalytical and Nuclear Chemistry – RANC 2016 (poster)

NEUTRON ACTIVATION ANALYSIS OF PHYTOTHERAPICS OF MAYTENUS ILICIFOLIA AND SOLANUM MELONGENA PLANTS

P55

L.M. Pereira^{a,1} and M. Saiki²

^a luan.pereira@usp.br

¹Institute of Chemistry, University of São Paulo, São Paulo, Brazil

²Nuclear and Energy Research Institute, São Paulo, Brazil

In Brazil, the consumption of phytotherapics has become very popular due to the vast biodiversity of the immense flora, to the belief that plants that are of natural origin are safe and without side effects. Besides phytotherapics, in general, are cheaper than synthetic products. The objective of this study is to evaluate the elemental concentrations in phytotherapics of the plants *Maytenus ilicifolia*, also known as Holly or "Espinheira Santa", and *Solanum melongena*, known as Eggplant. The

analysis of the elemental composition of phytoterapics is of great importance since these products may contain toxic or essential elements above of the safe limits for human consumption. The determinations also may be used to study the correlation the presence of some elements with their therapeutic effects. The phytoterapics samples were acquired in drug stores in São Paulo city and they were in powder form placed in capsules. Their elemental concentrations were determined by Neutron Activation Analysis (NAA) method. Aliquots of the samples and synthetic elemental standards were irradiated at the IEA-R1 nuclear reactor with thermal neutron flux of about $4.24 \times 10^{12} \text{ n cm}^{-2} \text{ s}^{-1}$ during 16h. After adequate decay times, the irradiated samples and standards were measured using a HGe detector coupled to a gamma ray spectrometer. The radionuclides were identified by the gamma rays energies and the half- lives. Concentrations of the elements were calculated by comparative method. For quality control of the results, the certified reference material INCT-MPH-2 Mixed Polish Herbs was analyzed. Elements Br, Ca, Cr, Cs, Co, Fe, K, La, Rb, Sb, Sc, Se and Zn were determined in this study. Results obtained in the certified reference material showed a good agreement with the certified values. The variation (Relative Standard Deviation) of the contents of each capsule was of 6.1% for "Espinheira Santa" sample, and of 5.6% for Eggplant. This result indicates that the sample of "Espinheira Santa" phytoterapic presented more homogeneous in terms of mass of the contents in each capsule than that of Eggplant. In the phytoterapics, the elements Ca and K were found at the percentage levels, the elements Br, Fe, Rb and Zn at the $\mu\text{g/g}$ and the Co, Cr, Cs, La, Sb and Sc at the ng/g level. In the Eggplant phytoterapic, the element As was found but at very low concentration of ng/g .

This work was presented at International Nuclear Atlantic Conference – INAC 2017 (poster)

P56 TRACE ELEMENTS DETERMINED IN TURTLES *TRACHEMYS SCRIPTA ELEGANS* FROM THE URBAN AREA OF SÃO PAULO

L.P. Sartori^{a,1}, L. Leonardo^{1,2}, S.R. Damatto² and N.D. Santos²

^a ipsartori@gmail.com

¹São Camilo University Center, Brazil

²Nuclear and Energy Research Institute, São Paulo, Brazil

The red-eared-turtle *Trachemys scripta elegans*, belonging to the suborder Cryptodira and family Emydidae, is farmed in the Mississippi Valley in the USA and sold throughout the world as one of the most traded pets. An increasing number of species are frequently released by owners in natural wetlands and in urban areas. This species is resistant and may spread parasites and threaten native turtle populations. Many countries chose to perform euthanasia to control its population, avoiding the threat to local biodiversity. Animals were studied here using Instrumental Neutron Activation Analysis (INAA) to determine metallic elements Ca, Fe, Na, Zn, aiming to assess the concentrations on different tissues in the body of ten female