

A PRELIMINARY STUDY OF THE EFFECT OF SOIL INORGANIC COMPOSITION IN THE ELEMENTAL CONCENTRATIONS OF CASEARIA SYLVESTRIS MEDICINAL PLANT LEAVES



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1. INTRODUCTION

Casearia sylvestris is a medicinal plant species from Flacourtiaceae family. It is used to treat a variety of diseases due to its antiseptic, cicatrizing, anesthetic and anti-ulcer properties (Sertié et al., 2000). The efficacy of a medicinal plant for curative purposes is generally related to its organic constituents however the elements play an important role in the formation of active constituents that are responsible for its pharmacological activity. (Lovkova et al. 2001).

The differences in the elemental uptake by plants have been attributed to specific characteristics of each plant species, climatic conditions and also to the pH and mineral compositions of the soil in which they were cultivated. On the other hand there is a great interest in elucidating the different pharmacological activities shown by a same medicinal plant species. In this study, instrumental neutron activation analysis was applied to analyze *C. sylvestris* leaves and soil samples collected in three different sites. The purpose of this study was to verify the effect of the soil composition upon the concentrations of elements present in leaves of *C. sylvestris*.

2. EXPERIMENTAL

Leaves of *C. sylvestris* medicinal plant and soil samples were collected in three different sampling sites located at the Atlantic Forest, São Paulo State, Brazil. These three sites were: Instituto de Química da USP (IQUSP), Morro Grande - SP and Morro Grande - Cotia. For the analyses, the plant leaves were washed, freeze-dried and ground to obtain a fine powder. Soil samples were also ground and sifted to obtain a fine powder.

About 150 mg of each sample were irradiated at the nuclear reactor IEA-R1 along with synthetic standards of the elements. Short and long irradiations with thermal neutron flux from 10^{11} to 10^{12} n cm⁻² s⁻¹ were used in these analyses. After appropriate decay times, the irradiated samples and standards were measured using an HGe detector coupled to a gamma ray spectrometer. The identification of the radioisotopes was carried out by their half-lives and their gamma ray energies and the concentrations of elements were calculated by comparative method.

3. RESULTS AND DISCUSSION

Quality control of the results was evaluated by analyzing certified reference materials. Results obtained for NIST 1515 Apple Leaves and NIST 1573a Tomato Leaves were presented in a previous paper (Yamashita et al., 2005). In these analyses relative standard deviations varying from 0.2 to 11.4 % and relative errors lower than 10% were obtained. The precision and the accuracy of the soil results were evaluated by analyzing IAEA Soil-7 and USGS W1 certified geological reference materials. Their results presented relative standard deviations varying from 0.8 to 9.2% and relative errors lower than 14.6%.

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Figure 1 presents the results obtained in the analyses of *C. sylvestris* samples from three different spots. As can be seen in this Figure, Ca, K and Mg presented the highest concentrations at the level of percentages. The lowest concentrations were obtained for Co, Cr, Cs, La, Sb and Sc, at the level of mg kg⁻¹. Comparisons made between the results obtained for leaves from different origins indicated that the sample collected at IQUSP presents higher elemental concentrations than those obtained for the samples from Morro Grande. The exceptions were Cs and Rb.

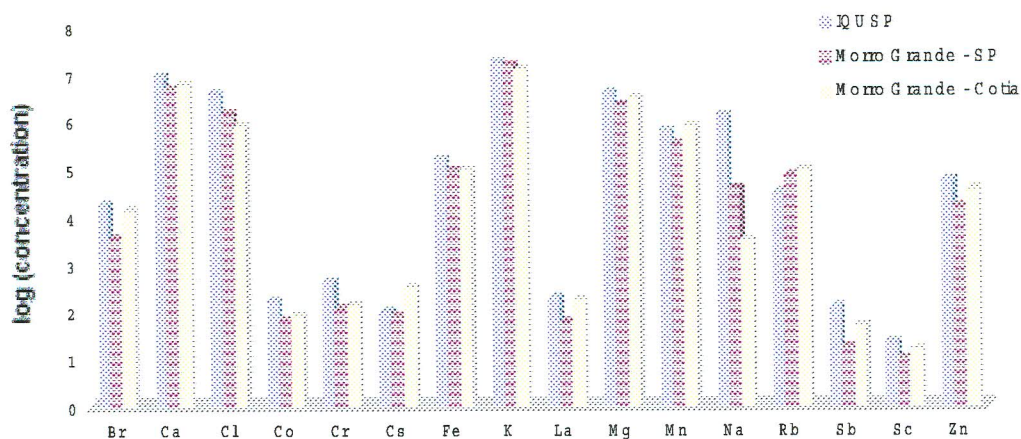


Figure 1 – Mean values of elemental concentrations in *C. sylvestris* from three different sites (IQUSP, Morro Grande -SP and Morro Grande -Cotia). Concentrations are given in mg kg⁻¹

Results obtained for soil samples are presented in Figure 2. Among the three soil samples, the one from IQUSP presented higher concentrations of Ca, Fe, Zn and rare earth elements than those obtained for the two samples from Morro Grande. These results indicate that there is a relation between the elemental concentrations present in the samples of soils and plant leaves. Results obtained in this work suggest the pharmacological study of *C. sylvestris* medicinal plant cultivated in different sites.



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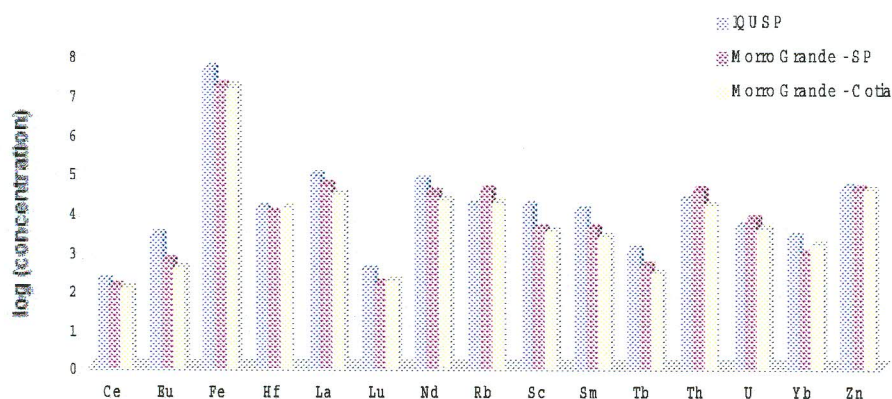


Figure 3 – Mean values of elemental concentrations obtained for soils collected at three different sites where *C. sylvestris* plants were grown. Concentrations are given in mg kg⁻¹

4. ACKNOWLEDGEMENTS

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5. REFERENCES

- LOVKOVA, M. Y.; BUZUK, G. N.; SOKOLOVA, S. M.; KLIMENT'EVA, N. I. Chemical Feature of Medicinal Plants (Review), *Applied Biochemistry and Microbiology*, v. 37, p. 229-237, 2001.
- SERTIE, J. A. A.; CARVALHO, J. C. T.; PANIZZA, S. Antiulcer activity of the crude extract from the leaves of *Casearia sylvestris*. *Pharmaceutical Biology*, v. 38, n. 2, p.112-119, 2000.
- YAMASHITA, C.I.; SAIKI, M. Characterization of trace elements in *Casearia* medicinal plant by neutron activation analysis, Accepted for publication in *Applied Radiation and Isotopes*, 2005.

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