رسالة

POSSIBLE USES OF ACTIVATION ANALYSIS IN STUDIES OF HEAVY METALS IN AGRICULTURAL ENVIRONMENT

By

MAGDY AHMED MOHAMED RIZK

A thesis submitted in partial fulfillment
of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

In

Agricultural Science
(Soil Science)

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Department of Soil Science
Faculty of Agriculture
Ain Shams University

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APPROVAL SHEET

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ABSTRACT

Three experiments were conducted to study the possible uses of activation analysis to investigate heavy metals content in agricultural environment. The feasibility use of instrumental neutron activation analysis was investigated using standard references materials, National Bureau of Standard, orchard leaves 1571 and International Atomic Energy Agency, soil Soil-5 lake sediments SL-1. The comparison between instrumental neutron activation analysis and atomic absorption spectrometry techniques shows the favorability of using activation analysis technique. The efficient measurement of spiked biological sample as determined by instrumental neutron activation analysis technique was studied The use of instrumental neutron activation analysis and atomic absorption spectrometry for study of organic wastes, sediments, soils treated with sewage effeluent, aquatic plants and plants grown on soil treated with sewage effeluent was also showed. The data for the comparison between the two analytical techniques , instrumental neutron activation analysis and atomic absorption spectrometry showed the possibility of use the methods for such study.

Key Words : Instrumental neutron activation analysis , atomic absorption spectrometry , heavy elements , plant , soil , sediments .

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INTRODUCTION

During the past 3 decades since the introduction of a practical system which allows quantitative analytical atomic absorption spectrometry (AAS), the technique has become one of those most extensively employed for the determination of trace elements of a wide variety of materials.

Relative few problems are encountered in the determination, by AAS of trace concentrations, of elements in dilute aqueous solutions. For matrices of biological origin , e.g. Soil , plant tissues and sediments materials, it is essential to ensure adequate attention to sampling, sample pretreatment and elimination or compensation for matrix effects if accurate and precise results are to be obtained by the technique.

In recent years with the increased concern about pollution of the environment, many trace elements have become the main object of interest through their increased concentration in air, water, food, soil and ultimately in animal tissues and fluids. Multielement analysis of sewage sludge, atmospheric particulates from smelters mining activities and the agronomic practices in soils; e.g. fertilization, pesticides, herbicides and irrigation with low quality water, has provided an

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