Phytoremediation of contaminated soils by Th and U

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This study evaluates qualitatively and quantitatively some plant species, such as sunflower (Helianthus annuus L.), castor bean (Ricinus communis L.), radish (Raphanus sativus L.), as the phytoremediation capacity under tropical conditions of local soils contaminated by toxic elements such as thorium and uranium specifically, in areas where mining and processing its ores. That is, those found in the pits of mines Poços de Caldas (MG) and Caitité (BA) and possible accidents caused by contamination [1] [2].

It is intended to generate a database and methodology of approaching to the problem of soil contamination with compounds of thorium and uranium from nuclear installations in Brazil, in different types of soils, plants and tropical conditions.

This project can serve as an embryo for the consolidation of a Remediation Protocol for these types of elements, mainly to serve clients as the National Commission of Nuclear Energy (CNEN) and Brazilian Nuclear Industries (INB).

Several experiments are conducted on a bench scale and in a greenhouse. Varying species, the levels of contamination: soil types and other factors, samples will be handled and the level of contamination will be analyzed by spectrophotometry UV/Vis, Fluorescence Spectroscopy X-Ray and Absorption Spectrometry Coupled Plasma.

Tests were performed to the initial selection of seed plant species, which were subsequently acquired cultivars in certified CATI / SP.

The developed methodology wet digestion with HNO_3/H_2O_2 parties for root, stem and leaf specimens is listed in order subsequent physico-chemical analysis of the samples.

The preparation and physico-chemical analyses soils that are used in the experiments.

The definition of the analytical methodology is employed for the determination of Th and U in the soil sample of employees and plant parts studied.

The design and the construction of a Low Cost Greenhouse will be carried out the experiments of germination, vegetative growth and phytoremediation capacity of plant species, shown in the illustrations below.

Figure 1 – Low Cost Greenhouse.

Figure 2 - Seed germination in a Gerbox.

References

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