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Natural radionuclides levels in spices and medicinal plants by gamma spectrometry

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This work is a contribution to the valorization of nuclear technics for environmental monitoring, mainly natural radioactivity in edible vegetation. The activities of natural radionuclides in major groups of widely used spices and medicinal plants in Tunisia have been investigated. In this aim, 18 selected samples imported from different countries were purchased in the dried form of roots, leaves, seeds, barks, flowers and fruits from local herbalists and farmers. Activity concentrations in all samples were measured by gamma spectrometry. Specific activity concentrations measured in the considered samples show different levels in ^{40}K and ^{238}U . These radioanalytical results of ^{40}K showed different levels activity concentrations ranging from 168.72 to 1154.1 Bq/kg. They are about 168.72 Bq/kg, 985.64 Bq/kg, 480.27 Bq/kg, 606.15 Bq/kg, 168.72 Bq/kg and 268.02 to 871.4 Bq/kg respectively for fruits, roots, flowers, leaves, barks and seeds. The activity of this nuclide is important in comparison to other radionuclides, which is due to the natural abundance of this essential nutrient in the soil and its high absorption by plants. Determined concentrations of ^{238}U ranged from 11.02 Bq/kg and 123.18 Bq/kg. The highest concentrations were obtained for red pepper and fennel characterized with activity concentrations of 123.18 Bq/kg and 103.04 Bq/kg respectively.

According to this study, it was concluded that many factors such as plants composition, mobility of the radionuclides, climate and depth distribution of roots control the transfer and uptake of radionuclides from soil into plants.

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