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The Release of Heavy Metals and Gamma Emitter Radionuclides on Plant Leaves Measurements via A.A.S. and N.A.A. (Neutron Activation Analysis) in Tehran City Center

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Abstract

Effort has been made for the measurements of Pb, Cd, Zn, Cu and radionuclide release of gamma emitters via A.A.S. and N.A.A (Neutron Activation Analysis) and gamma spectrometry with the use of Ge-Li detector. Measurements were made in Tehran city center, with the help of Tehran nuclear research center. Measurements were made on soil and leaves of certain plant. The samples were collected from different site of north, south, west and east and central of Tehran city center in 13 stations. Measurements were made in different seasons of spring and summer in a comparison. The concentration of Pb, Zn, Cu, Cd in plant has shown the range of 41.8, 52.56, 12.53 and .1.09 (ppm) respectively. Where the concentration of Pb, Zn, Cu, Cd in soil samples were in the order of 66.6., 83.6., 28.8 and 0.32 (ppm) respectively. Besides the concentration of, Zn, Cu, Cd in fallout collected on surface leaves has shown a range of 10.67, 2.35, and 0.063 (ppm) respectively. All measurements were considered in a comparison with Karaj station measurements as a background. Which shows the fallout concentration of Zn, Cu and Cd in Tehran are much higher than those of Karaj samples by means of 1.77 times, 2.43 times, 2.55 times respectively. The comparison of measurements in this study is in agreement with other references for Zn, Cd, Cu, in other countries. But there are excessive amount of Pb which could be explained as air pollutants due to the excessive use of fossil fuels and heavy traffic in Tehran. The Cd Concentration in leaves in the range of 0.062 ppm is in agreement with those of international Concentration measurements in cabbage, Africa. The low level radioactivity measurements of gamma emitter radionuclides via Ge-LI detector by 40,000 count/second, has shown no increase of radionuclide release in fall out samples .Which is explained as background level.

Keywords: A.A.S. method, gamma emitter radionuclide measurements, N.A.A. method, Tehran City Center, trace elements