



Contribution ID: 211

Type: Verbal

NAA for life sciences at FLNP JINR: present and future

Within the broad spectrum of activities in the Life Sciences at JINR such as nuclear medicine and pharmacy, radiation biology, radioecology, radioisotope production –radioanalytical investigations play a special role due to the long-term experience in multi-element instrumental neutron activation analysis (INAA) at the reactor IBR-2 of FLNP, JINR. Activation with epithermal neutrons along with conventional and cyclic INAA is presently being used in numerous projects on air pollution studies with biomonitors (moss, lichens, tree bark). The results on moss surveys (heavy metal atmospheric deposition study) for some selected areas of Central Russia, South Urals, and countries of Europe (Bulgaria, Croatia, Poland, Romania, Bosnia, Serbia, Macedonia, Slovakia, Western Ukraine, Thace Region of Turkey) have been reported since 1995 to the European Atlas of Heavy Metal Atmospheric Deposition edited under the auspices of the United Nations Economic Commission for Europe. Similar investigations were initiated also in Mongolia, Vietnam, China and South Korea with analytical opportunities offered in Dubna. Applied to the analysis of air filters, INAA is successfully used in assessing quality of London underground air, air of Bratislava, and the Sahara desert impact on the Greater Cairo Area. Epithermal activation analysis in combination with atomic absorption spectrometry and energy-disperse X-ray fluorescence allowed source evaluation of metals in soil from some industrial areas of Russia (South Urals, Kola Peninsula) and Macedonia (Veles province). The analytical possibilities of NAA are favorably used in biotechnology: (i) in the development of new pharmaceuticals based on the blue-green alga *Spirulina platensis*; (ii) for transformation of toxic forms of elements into non-toxic ones by *Arthrobacter oxidans*; and (iii) for investigation of bacterial leaching of metals, including uranium and thorium, from low-grade ores, rocks and industrial wastes. Occupational health studies at some fertilizer plants in Russia, Uzbekistan, Poland, and Romania, the quality of foodstuffs grown in some contaminated areas of Russia, Romania and South Africa were investigated in the framework of the IAEA Co-ordinated Research Programmes, the EU 5th Frame Programme and a project with the Nuclear Energy Corporation of South Africa (NECSA). The results of applying NAA to the problem of decommissioning of Nuclear Power Plants and utilization of industrial wastes are demonstrated. The prospects of the above investigations along with the new trends and projects (role of trace elements in the development of atherosclerosis, health impacts of nano-particles, etc.) to be carried out at the upgraded reactor IBR-2M are reviewed. The educational aspect of using the radioanalytical facility REGATA at the IBR-2M reactor for training young specialists from JINR Member- and non-Member-States is touched upon.

Primary author: Dr FRONTASYEVA, Marina (Joint Institute for Nuclear Research)

Presenter: Dr FRONTASYEVA, Marina (Joint Institute for Nuclear Research)

Track Classification: Nuclear Analytical Methods