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Recent Radiation Research and Technology Development in Croatia

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The Ruđer Bošković Institute is Croatia's leading scientific institute. The Radiation Chemistry and Dosimetry Laboratory (RCDL) has remained until the present day the only unit in the country pursuing both basic and applied scientific research in the fields of radiation chemistry, dosimetry and radiation processing. Physico-chemical effects of irradiation, being function of absorbed dose, are used for the quantitation of absorbed energy, i.e., dosimetry. Two families of liquid chemical dosimetry systems have been developed by the RCDL. The low-dose system is nowadays one of the best characterized chemical dosimetry systems in the range of therapy and accident doses. The high-dose system, based on the ethanol-chlorobenzene (ECB), has been accepted as a joint ISO/ASTM 51538 standard.

Research in applied radiation chemistry and radiation microbiology, analyses of epidemiologic and economic data, our presence on national and international bodies generating and maintaining corresponding regulations, permanent improvements of our irradiation facilities and other activities all have helped introduce into Croatia the necessary scientific, technical, legal, economic and other prerequisites for technology transfer in the yield of radiation processing. At present, RCDL has the only facility of its kind in Croatia and the region. The main equipment is a batch type panoramic γ -irradiator (95 kCi ^{60}Co) which has been designed by the RCDL staff, and its periodical upgrading has been regularly assisted by the IAEA. Although only an experimental facility at the beginning, it was designed with the future role of a multipurpose pilot scale irradiation facility in mind, capable to contain more than 100 kCi of ^{60}Co . The irradiator is suitable for a variety of applications, from medium dose range used in radiobiology to high doses used in radiation processing and radiation chemistry. The capacity of the irradiator chamber is 4–6 m³ of material per batch. There is no conveyor to transport goods into and out of irradiation chamber giving maximum flexibility with respect to the dimensions and weight of the objects. Performing commercial scale irradiation for sterilization, pasteurization, decontamination and disinfestation of various materials such as medical supplies, pharmaceuticals, foods, cosmetics and toiletries, packaging, etc., provided the necessary understanding of practical aspects of irradiation processes and dosimetric control methods. In recent years the interest for irradiation protection and conservation treatment of cultural artefacts has been strongly increased and successfully carried out in Croatia and region.

In this lecture a review of scientific research and development of the RCDL over the past five years will be presented, with special attention given to the recent upgrading of the facility. This upgrading has enabled the RCDL to offer the exchange of knowledge and experience in many areas of scientific research as well as to offer more extensive and diverse applications of radiation technology.

The support of the IAEA in ensuring timely supplies ⁶⁰Co over the years, especially through the recent Technical Co-operation Project CRO/1/006 (2014-2015) is gratefully acknowledged.

Country/Organization invited to participate

Croatia

Primary author: Ms MIHALJEVIĆ, Branka (Ruder Boskovic Institute, Croatia)

Co-author: Ms KNEZEVIC, Zeljka (Ruder Boskovic Institute, Croatia)

Presenter: Ms MIHALJEVIĆ, Branka (Ruder Boskovic Institute, Croatia)

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