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## Synergetic effect of ionizing radiation and adsorption on methylene blue degradation

Ljiljana Matović, Ksenija Kumrić, Radojka Vujasin, Aleksandar Devečerski, Mia Omerašević, Marija Egerić and Đorđe Petrović  
University of Belgrade, Serbia

Dyes and pigments are used by many industries to color their products. Presence of dye molecules, even at very low concentrations, is undesirable and may significantly affect photosynthetic activity in aquatic systems. A new approach that combines the use of carbon material, as an adsorbent matrix, coupled with the high energy irradiation derived from the radioactive waste sources was used for degradation of methylene blue (MB), which was taken as an example of contaminant. Synergistic effect on the degradation of the dye was investigated. Irradiated solutions of MB with carbon-based material show significantly greater decrease in absorption, then the unirradiated solutions using only carbon-based material or irradiation. Positions of all bands in spectra remain unchanged except a slight shift and changes in the relative intensities of the bands at  $1100\text{ cm}^{-1}$  assigned to C-O stretching in phenolic groups ( $1000\text{-}1250\text{ cm}^{-1}$ ). High energy radiation in water medium can produce radiolysis of water i.e. several active species such as  $\text{H}_2$ ,  $\text{H}_2\text{O}_2$ ,  $\text{H}^+$ ,  $\text{OH}^-$ ,  $\text{e}_{\text{aq}}^-$ ,  $\bullet\text{OH}$  and  $\bullet\text{H}$ . As a result of formed reactive species which originate from the irradiated material and radiolysis of water, the amplitude of all absorption bands characteristic for MB disappeared completely. Joint application of those techniques, radiolysis and adsorption, using waste radioactive sources, as well as modified waste materials, has not been applied before.

### Biography

Ljiljana Matović is the Director of Department of Material Science in "Vinča" Institute of Nuclear Sciences. She is working as a Researcher in the field of Material Science, dealing with the synthesis, characterization and modification of different kind of materials ranging from synthetic (carbon, metal hydrides) to natural (clay, zeolites) and their composites. Her main field of interest is materials for waste conversion. She has teaching experience as a Mentor of PhDs' and Masters' students as well as management experience as Science Project Leader and experience in production and investigation of radiopharmaceuticals.

ljiljam@vin.bg.ac.rs

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