RADIOPROTECTIVE POLIELECTROLITE COMPLEXES

M.I. MUSTAFAEV

Istanbul Technical University, Chemistry Department,
80626 Maslak, Istanbul, TURKEY
Baku State University, Chemistry Department,
Baku, AZERBAIJAN

The mechanism of the formation of complexes of linear synthetic polyanions with serum proteins in the presence of transition metal ions was investigated. Soluble and insoluble ternary complexes of polyanions with similarly charged proteins are formed upon addition of metal (Me) ions (Cu²⁺, Al³⁺, Fe³⁺, etc.) to the mixtures. The pattern of distribution of Me ions between macromolecules and of protein globules between polymer-metal complex particles were analyzed and a hypothetical structural scheme for the formation of polycomplexes is proposed.

Aqueous solutions of free components and ternary polycomplexes have been irradiated with 60Co γ-rays and the changes occurred have been measured by the difference physico-chemical methods. Addition of Me⁺ ions to polyanion-protein mixture have been shown to protect the macromolecule components of ternary polycomplexes against radiation damage. The stable polycomplexes have a protective activity. The stabilizing (protective) effect is increased with the increasing the concentration of protein in mixture and upon addition of NaCl to the polycomplex solutions. It is proposed that the mechanism underlying the protection effect in the mixture might be related to complexation of metal ions in polycomplex with superoxide anion (O₂⁻)(cyclically reduced and oxidized). These results are very important for the creation of radioprotectors on the basis of synthetic polymers.