INTELLIGENT DRUG DELIVERY SYSTEMS OBTAINED BY RADIATION

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In recent years a great deal of work has been devoted on the synthesis and characterization of intelligent hydrogels which are capable of reversibly responding to small changes of the environment properties, such as pH, light, ionic strength, electric field, chemicals and temperature [1]. With regard to the latter parameter, it should be noted that there is a wide variety of hydrogels [2] which exhibit an anomalous behaviour when they are in contact with water, i.e. they shrink at high temperatures and swell at low temperatures. Recently, this behaviour has been observed also for hydrogels based on acrylic and methacrylic monomers with pendant amino acid groups [3]. In our laboratories a study was undertaken concerning the radiation-induced polymerization and crosslinking of acryloyl=L=proline methyl ester in the presence or in the absence of hydrophilic or hydrophobic comonomers. The hydrogel specimens were characterized at different temperatures by determination of degree of swelling in water and evaluation of porosity by scanning electron microscopy. It was observed that both swelling and pore size decreased as the temperature increased. An analgesic and antipyretic drug was entrapped into different hydrogels and its release rate was found to depend on whether the temperature was above or below the lower critical solution temperature of the polymer material. A thermoresponsive hydrogel was also obtained by radiation - induced polymerization of acryloyl-L-proline methyl ester in the presence of an acrylic derivative of the drug previously used and a mechanism of release mainly due to the hydrolysis of ester bond was put forward.

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