



Contribution ID: 169

Type: Poster

Synthesis by Gamma Radiation and Characterization of Poly(Vinylpyrrolidone) Nanogel

Thursday, 27 April 2017 14:15 (2 hours)

The synthesis of Polyvinylpyrrolidone (PVP) nanogels by ionizing radiation techniques (gamma irradiation), for their evaluation as potential system of drug delivery was the aim of this research. Solutions were prepared with water purified by distillation and in order to remove any dust particles and/or polymer aggregates, solutions were filtered subsequently through filters of 0.45 and 0.22 μm pore size. Gamma irradiation was carried out with a panorama 60 Co source at dose ranging from 5 to 25 KGy.

Particularly, the polyvinylpyrrolidone nanogels can be obtained by gamma radiation, based not on polymerization, but on intramolecular crosslinking of polymers chains, in aqueous solutions. The nanogel characterization was performed by electron microscopy (TEM, SEM), DRX, spectroscopy (UV-visible and IR), light scattering, viscosimetry, delivery of an active agents and cytotoxicity trials

The results showed that in dependence on the polymer concentration and the rate dose two different crosslinking reactions can take place. Irradiation experiments at room temperature in diluted solution with further increasing of the radiation dose lead to the formation of PVP nanogels due to an intramolecular crosslinking reaction. By using both light scattering and TEM the PVP nanogels were measured, these showed a size distribution of 50.10 nm. They have lots of advantages over conventional systems since they enhance the delivery, extend the bioactivity of the drug by protecting them from environmental effects in biological media, show minimal side effects, demonstrate high performance characteristics, and are more economical since minimum amount of expensive drugs are used.

Country/Organization invited to participate

Cuba

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Session Classification: P-A2

Track Classification: RADIATION SYNTHESIS AND MODIFICATION OF MATERIALS