CARBOHYDRATE HYDROGEL NANOPARTICLES AS A DRUG DELIVERY SYSTEM

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Research and development in nanotechnology is growing rapidly worldwide. A major feature of this activity is the development of new materials in the nanometer scale, including nanoparticles. We now show the development of different carbohydrate hydrogel nanoparticles as a drug delivery system. **1-** Alginate nanoparticles, produced by cross-linking sodium alginate with divalent cations, are widely used as an encapsulation system. Alginate-galactomannan-albumin (AGA) mixture have, in the viscoelastic linear region, a gel behavior only at higher frequencies. The AGA system was sprayed through a small orifice into a stirred calcium chloride solution for nanobead production. Albumin encapsulation in the AGA nanoparticules was analyzed by electronic and atomic force microscopy (AFM). **2-** Nanocapsules of *N*-carboxymethyl-chitosan, *O*-carboxymethyl-chitosan and water soluble alkylated derivatives were used for encapsulation of liposoluble drugs such as camptothecin. HPSEC-MALLS and AFM showed a spherical shape and at a critical micellization concentration (CMC) of 1 mg/mL. These derivatives also form a hydrophobic nano-environment, determined by the use of a pyrene fluorescence probe. **3-** The delivery of curcumin from a xanthan:galactomannan (X-G) hydrogel, as well as physical-chemical modification of hydrogel induced by curcumin, were analyzed. All samples gave a gel-like response with G' significantly larger than G'', with both moduli being independent over the frequency studied (0.01–10 Hz). Tan δ of the X-G hydrogel was higher for the X-G-curcumin system, suggesting a modification on the network when curcumin is present. The avian chorioallantoic membrane (CAM) was used as *in vivo* method for determining the anti-angiogenic and anti-inflammatory responses of the X-G-curcumin system.

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