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Title: Cross-linked alginate/chitosan polyelectrolytes as carrier of active compound and beef color stabilizer.

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Abstract

The aim of this work was to develop polyelectrolyte material suitable for active beef steaks coatings, by complexation of chitosan (CH) and sodium alginate (ALG) in a broad range of alginate/chitosan ratios (R). The rheological analysis confirmed significant effect of polymers ratios on the physical properties of sodium alginate-chitosan (ACH) hydrosols. The shear thinning non-Newtonian nature, thixotropic behavior and gel-like structure of solutions were displayed. Obtained complexes possess DPPH radical scavenging activity corresponding to 5.33, 17.06 and 41.41 μM Trolox/ml for 0 ppm, 500 ppm and 1000 ppm of sodium erythorbate dose, respectively. Application of ACH hydrosols enriched with 1000 ppm of sodium erythorbate enhanced redness and color stability of beef steaks during storage (ΔE after 2-weeks of storage=1.44 \pm 0.08) compared to uncovered beef (ΔE after 2-weeks of storage=3.53 \pm 0.13). The limited solubility in range of 0% - 54.56% as well as favorable wetting properties (contact angle between 45° – 66°) of polyelectrolyte ACH films were obtained.

Keywords: alginate; chitosan; sodium erythorbate; color stability; polyelectrolyte complex; rheological analysis; DPPH radical scavenging activity; beef; active coatings; fluorescent light

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