ABSTRACT

Charles University, Faculty of Pharmacy in Hradci Králové
Department of Pharmaceutical Technology

Name: Martina Kišková
Title of diploma thesis: Adhesive properties of matrix tablets
Supervisor: PharmDr. Eva Šnejdrová, Ph.D.

The diploma thesis deals with the evaluation of rheological and adhesive properties of the mucin, aqueous dispersions of polymeric carriers and matrix tablets based on chitosan and sodium alginate or iota-carrageenan loaded with the salicylic acid using absolute rotational rheometer. The theoretical part deals with the characterization and classification of matrix tablets, polymeric carriers (sodium alginate, chitosan and carrageenan) and with the principles of evaluation of rotational, adhesive and oscillational tests performed in the experimental part. The mucin from porcine gastric used as a model substrate for adhesion tests behaves as a viscoelastic solid and its adhesive strength decreases with increasing hydration. Significantly higher adhesive strength was found for chitosan at pH 1.2 and sodium alginate at pH 6.8 compared to the adhesive strength of iota-carrageenan. In terms of viscoelastic properties, chitosan and sodium alginate are viscoelastic fluids, but iota-carrageenan is a viscoelastic solid. Iota-carrageenan forms the stiffest gel after hydration at pH 6.8 and also has the lowest degree of structural relaxation under stress, making it more suitable for matrix tablet formulations. For matrix tablets containing chitosan and sodium alginate, the viscosity increases with hydration time at pH 6.8 and with increasing concentration of sodium alginate. By replacing sodium alginate with iota-carrageenan, the viscosity decreases. The value of the adhesive strength of matrix tablets decreases with increasing concentration of sodium alginate or iota-carrageenan. Matrix tablets containing a mixture of chitosan and iota-carrageenan show better intestinal adhesion and thus longer drug release from the tablet compared to sodium alginate. The best adhesion is ensured by the formulation with the lowest iota-carrageenan content, which is in the same ratio as chitosan.

Keywords: matrix tablet, chitosan, sodium alginate, iota-carrageenan, viscoelasticity, adhesion