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Development and characterization of sodium alginate polymer film as a buccal mucoadhesive drug delivery system

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Nowadays oral mucoadhesive systems have an increasingly greater role in the pharmaceutical industry. These systems can avoid the first-pass effect because they allow drugs to be absorbed directly into the systemic circulation and they have further advantages [1, 2]. The aim of this work is to formulate and evaluate polymer films of different composition that are able to bind to the buccal mucosa.

Sodium alginate and hydroxypropyl methylcellulose (HPMC) were used as polymer, glycerol was the plasticizer, and cetirizine dihydrochloride served as active pharmaceutical ingredient. Mucin was used in the mucoadhesion tests. The polymer film was prepared at room temperature by solvent casting method. The polymer films contained different amounts of sodium alginate, HPMC and glycerol, but the same amount of cetirizine dihydrochloride. The thickness of the films was examined with a screw thread micrometer (Mitutoyo, Japan), the tensile strength and mucoadhesive force was tested with a laboratory constructed device. The physical and chemical properties of the films were investigated with FT-IR (Avatar 330 ThermoScientific, USA) and thermal analysis (Mettler Toledo, Switzerland). Surface free energy was examined by an optical contact angle-measuring apparatus (OCA20, DataPhysics, Germany). The dissolution of the active substance was tested by an ErwekaDT700 dissolution tester and the sample was measured by a UV spectrometer. The results showed that the material exerts a remarkable effect on the properties of polymer films, and the active substance showed homogeneous distribution.

References

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