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Surface properties and surface free energy of cellulosic etc mucoadhesive polymers

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Highlights

- The sorption and wettability properties for mucoadhesive polymers were determined.
- The contact angle measurements for powders were performed according to the Washburn method.
- The surface properties of polymers were assessed by the IGC technique.
- Three types of experimental investigation were applied for determination of surface energy of powders.

Abstract

The paper presents the sorption and wettability properties for several mucoadhesive polymers (Carbopol 974P NF (carbomer polymer; carboxy polymethylene), Noveon AA-1, (polycarbophil; acrylic acid polymer crosslinked with divinyl glycol) HPMC (hypromellose; cellulose 2-hydroxyethyl methyl ester) and HEC (cellulose 2-hydroxyethyl ether) and a film-forming polymer Kollidon VA 64 (polyvinylpyrrolidone-vinyl acetate copolymer)) commonly used in controlled drug delivery systems. Moreover, the surface energy of powders was determined using the data obtained according to the three types of experimental investigation. The contact angle measurements for powders were performed according to the Washburn method and using the capillary rise technique. Whereas the sessile drop method was performed on the compressed discs of mucoadhesive polymers. For the surface characterization the IGC technique was also applied. The results obtained by different methods, for both: wettability and surface energies, were compared and correlated. The presented study showed significant differences in the morphology and surface properties of mucoadhesion polymers considered. It was confirmed that for the accurate quantification of the free surface energy (and its components), for mucoadhesive polymers considered, not only the IGC in finite concentration, but also the Washburn method should be used.

Keywords: mucoadhesive polymers; drug delivery systems; contact angle; sorption of powders; IGC technique; surface energy.

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