

Adhesive properties of poly (vinyl alcohol) cryogels

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Mucoadhesive drug delivery systems offer enhanced bioavailability compared to conventional dosage forms by increasing the residence time of the active ingredient. Poly (vinyl alcohol) possesses characteristics of a feasible and effective mucoadhesive polymer. The polymer undergoes sol-gel transition when subjected to multiple freeze-thaw cycles. Mucoadhesive property of the gel depends on the degree of polymer crystallization, which in turn depends on polymer molecular weight, number of freeze-thaw cycles, and upper/lower temperature extremes. In this study, adhesive properties (adhesive force and adhesiveness) of PVOH cryogels prepared at 3, 5, 8, and 10wt% aqueous concentration were characterized. PVOH aqueous solutions were prepared by dissolving PVOH in water at 90°C for two hours under stirring. Solutions were then subjected to two freeze-thaw cycles of freezing (4 hrs at -10°C) followed by thawing (2hrs at 25°C). The adhesive force and adhesiveness of the cryogels were measured using a CT3 Texture analyzer, following texture profile analysis (TPA). The adhesive force for different cryogels prepared at different concentrations were found 157, 265, 93 and 83mN, respectively; while adhesiveness were found 0.17, 0.28, 0.1 and 0.04mJ, respectively. It was observed that adhesive property of the cryogels is a function of polymer concentration, and is favored at lower PVOH aqueous concentrations.

Biography

Srinath Muppalaneni has B.S. in pharmacy from Andhra University (India, 2008), and M.S. in pharmaceutical science from Campbell University (USA, 2010). Srinath is a 2nd year Ph.D. student, developing abuse-resistant pharmaceutical dosage forms.

David Mastropietro received his B.S. in Pharmacy from Massachusetts College of Pharmacy in 1999. He is completing his Ph.D. in Pharmaceutics at Nova Southeastern University (NSU) with dissertation work focused on abuse-deterrent dosage-forms. Hossein Omidian has a M.Sc. in Chemical Engineering and a Ph.D. in Polymer Science. He is currently an Associate Professor at NSU where David and Srinath are both part of his research group.

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