

Preparation and Optimization of Curcumin-HP β CD Complex Bioadhesive Vaginal Films for Vaginal Candidiasis by Factorial Design

Authors : Umme Hani, H. G. Shivakumar, M. D. Younus Pasha

Abstract : The purpose of this work was to design and optimize a novel vaginal drug delivery system for more effective treatment against vaginal candidiasis. To achieve a better therapeutic efficacy and patient compliance in the treatment for vaginal candidiasis, herbal antifungal agent Curcumin which is 2.5 fold more potent than fluconazole at inhibiting the adhesion of candida albicans has been formulated in a bio-adhesive vaginal film. Curcumin was formulated in bio-adhesive film formulations that could be retained in the vagina for prolonged intervals. The polymeric films were prepared by solvent evaporation and optimized for various physicodynamic and aesthetic properties. Curcumin HP β CD (Hydroxypropyl β Cyclodextrin) was first developed to increase the solubility of curcumin. The formation of the Curcumin HP β CD complex was characterized by scanning electron microscopy (SEM), differential scanning calorimetry (DSC), and FT-IR and evaluated for its solubility. Curcumin HP β CD complex was formulated in a bio-adhesive film using hydroxypropyl methyl cellulose (HPMC) and Carbopol 934P and characterized. DSC and FT-IR data of Curcumin HP β CD indicate there was complex formation between the drug and HP β CD. The little moisture content ($8.02 \pm 0.34\%$ w/w) was present in the film, which helps them to remain stable and kept them from being completely dry and brittle. The mechanical properties, tensile strength, and percentage elongation at break reveal that the formulations were found to be soft and tough. The films showed good peelability, relatively good swelling index, and moderate tensile strength and retained vaginal mucosa up to 8 h. The developed Curcumin vaginal film could be a promising safe herbal medication and can ensure longer residence at the vagina and provide an efficient therapy for vaginal candidiasis.

Keywords : curcumin, curcumin-HP β CD complex, bio-adhesive vaginal film, vaginal candidiasis, 23 factorial design

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