



ORIGINAL RESEARCH

Design and characterization of a novel crosslinked, polymer ~~“Hydroxypropylmethylcellulose-Gelatin”~~ and its evaluation as a control release polymer in ciprofloxacin tablets.

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ABSTRACT

Background: The new trend in the field of pharmaceutical technology is the automation of drug delivery systems. Therefore, future generation of drug delivery systems could be derived from engineering polymers through cross-linking.

Objective: This research work was designed to formulate an extended-release ciprofloxacin tablet via a tailored two-component composite polymer.

Materials and methods: Hydroxypropylmethylcellulose and Gelatin (HPMC –GLT) ratios 4:0; 3:1; 2:2; 1:3 and 0:4 were cross-linked using citric acid. The batches were characterised by FTIR, swelling index, viscosity and pH. Five batches of ciprofloxacin 250 mg mixed with hybridized HPMC-GLT polymers ‘F₁, F₂, F₃, F₄, and F₅, were prepared by wet granulation technique. The granules were evaluated for bulk density, angle of repose and compressibility index. All crosslinked batches were crystalline in texture. The flow rate increased with the gelatin content. The granules were compressed on a rotary tableting machine. Tablets were evaluated for compactness and *in-vitro* dissolution in a buffer solution for 12 hours.

Results: The T₉₀% for the series of batches were: 150, 132, 252, 196, and 156 minutes respectively. Evaluation of branded ciprofloxacin tablets showed a disintegration time of 6 to 7 minutes and an average T₉₀% at 30 min. The compact F₃ (50 % GLT and 50 % HPMC) possessed the most desirable tablet properties. Average crushing strength, disintegration time, friability, and the T₉₀% were: 125 ± 5.0 N, >>30 min., 0.00 %, and 252 minutes, respectively.

Conclusion: Formulation F₃ is, therefore, recommended for future optimization in the design of controlled-release ciprofloxacin tablets.

Keywords: Ciprofloxacin; Controlled release; Crosslinked Polymers; Crosslinked HPMC; Gelatin