Novel Optimization of Shape, Swelling and Release Behaviors of Tolmetin Sodium Loaded Alginate Microbeads

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Abstract:

In the design of oral delivery, alginates (Alg) have attracted increasing attention. However, due to their hydrophilic character incorporation of small hydrophilic drugs such as tolmetin sodium (TOL) into Alg beads will not provide the desired regular shape as well as delayed drug release. There is no study investigating the effect of methylcellulose (MC) and dual cross-linking (CaCl2 and glutaraldehyde, GA) on their shape, swelling and release behaviors. Hence this study aimed to evaluate the influence of MC and cross-linking agents on these behaviors of Alg microbeads prepared using the ionotropic gelation method compared with Alg microspheres prepared with w/o emulsion method. The results obtained display some interesting information. Both concentration of MC and type of cross-linking agent had dramatic effects on shape as well as swelling, erosion and release behaviors of the prepared microbeads. Swelling through ion-exchange process of Alg/MC blend single cross-linked microbeads was hindered in the case of dual cross-linked microbeads. The release of the drug from Alg/MC dual cross-linked microbeads was extended for up to 12 h and the release mechanism was shifted from erosion type release to time-independent release process. Analgesic activity study indicated significantly different response patterns compared with plain TOL solution.

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