Preparation and characterization of biodegradable meloxicam gelatin microspheres for intra-articular administration

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Background and Aims: A controlled release delivery system that localizes meloxicam in synovial joint is preferred to treat inflammation in rheumatoid arthritis. Therefore, the purpose of this study was to develop and characterize meloxicam-loaded gelatin microspheres. The ability of native and oxidized sucrose to induce the cross-linking of gelatin was also studied.

Methods: Meloxicam gelatin microspheres were prepared by emulsion-congealing method and were characterized in terms of the percentage of encapsulation efficiency (%EE), particle size and release profile. The effect of different amounts of polymer, emulsifier, cross-linking agents (native and oxidized sucrose) and time of cross-linking on %EE and release profile was evaluated.

Results: The mean particle size of meloxicam-loaded gelatin microspheres for the selected formulation was around 100µm and the %EE was %55. Increasing the time of cross-linking from 5 to 10 min did not have any significant effect on %EE. Increasing the concentration of polymer from 25 to 35% (w/v) had a marked effect on %EE. The release of meloxicam was sufficiently retarded by the prepared microspheres.

Conclusions: The results demonstrated that sucrose could be used as a suitable and safe cross-linking agent for preparation of meloxicam loaded gelatin microspheres. The prepared biodegradable microspheres had appropriate physicochemical characteristics for intra-articular administration and may deserve further evaluations.

Keywords: Meloxicam; Gelatin microspheres; Sugar