

Preparation and Characterization of Mucoadhesive Microspheres Containing Antidiabetic Agent

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Abstract: *The study focuses on the preparation and evaluation of gliclazide-loaded microspheres using two distinct methods: Ionic Orifice Gelation and Emulsification Ionic Gelation. Various natural gums, including gum kondagogu, xanthan gum, and guar gum, were used as mucoadhesive polymers in different ratios with sodium alginate. Microspheres were characterized for particle size, angle of repose, microencapsulation efficiency, FT-IR, and in vitro drug release profiles. FT-IR and XRD analyses indicated significant interactions between gliclazide and the excipients, impacting the drug's crystallinity and dissolution behavior. Scanning Electron Microscopy (SEM) revealed that microspheres prepared via Ionic Orifice Gelation exhibited more uniform and spherical morphology compared to those prepared by Emulsification Ionic Gelation. Physical properties such as angle of repose, bulk density, Carr's index, Hausner's ratio, true density, and average particle size were assessed, showing differences in flowability and compressibility between formulations. The drug content and encapsulation efficiency varied, highlighting the importance of formulation parameters. In vitro release studies demonstrated that the microspheres could sustain drug release over an extended period, making them suitable for controlled drug delivery. The study concludes that the Ionic Orifice Gelation technique is superior for producing uniform microspheres with desirable physical properties and controlled drug release characteristics.*

Keywords: Gliclazide, Microspheres, Ionic Orifice Gelation, Emulsification Ionic Gelation, Sodium Alginate, Natural Gums, Mucoadhesive Polymers, Controlled Drug Delivery, FT-IR Analysis.