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(57) Abstract :
The present invention relates to a method for preparing a sustained-release formulation of antidiabetic drugs, such as metformin hydrochloride, using biodegradable polymers like hydroxypropyl methylcellulose (HPMC) and ethyl cellulose (EC). The process involves dissolving the drug in a polymer matrix, emulsifying the mixture, and evaporating the solvent to form microspheres. The optimized formulation, with a polymer-to-drug ratio of 2:1, demonstrated 88.5% drug encapsulation efficiency and an average particle size of 210 µm. In vitro release studies revealed a controlled release profile, with 35.6% of the drug released at 4 hours, 65.4% at 8 hours, and 92.3% at 24 hours, following Higuchi release kinetics ($R^2 = 0.981$). The formulation achieved a prolonged therapeutic effect, ensuring stable blood glucose levels for up to 24 hours. This invention offers an effective solution for improving patient adherence and providing consistent glycemic control in diabetes management.

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