

# ELECTROSPUN NANOFIBER FILMS FOR BUCCAL ADMINISTRATION OF GLIBENCLAMIDE

Sreehari S. Nair<sup>a</sup>, Shradha B. Adhalrao<sup>b</sup>, Dhanashree P. Sanap<sup>b\*</sup> and Kisan R. Jadhav<sup>b</sup>

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## ABSTRACT

This study aimed to develop and evaluate glibenclamide-loaded electrospun nanofiber films for buccal delivery, a promising strategy to overcome the solubility and bioavailability challenges associated with this biopharmaceutics classification system class II drug. The nanofiber films were formulated using electrospinning technology, incorporating polymers such as polyvinylpyrrolidone and ethyl cellulose. A central composite design was employed to optimize the formulation, focusing on factors like polymer concentration and flow rate. The optimized nanofiber film exhibited significant drug entrapment efficiency (93.56 %) and a sustained drug release of 90.72 % over 8 h. Scanning electron microscopy confirmed the uniform and non-crystalline nature of the nanofibers, indicating successful encapsulation of glibenclamide in an amorphous state. *In vitro* and *ex vivo* studies further demonstrated improved drug permeability through goat buccal mucosa. Mucoadhesive strength was measured at 17.12 g, ensuring prolonged buccal retention, while stability studies under accelerated conditions revealed no significant degradation over three months. The findings suggest that glibenclamide-loaded nanofiber films can enhance drug bioavailability through buccal administration, providing a practical substitute for traditional oral dosage forms for treating type II diabetes mellitus.