

# GASTRORETENTIVE MARVEL

CRAFTING MITIGLINIDE MATRIX TABLETS  
FOR INNOVATIVE DRUG DELIVERY

In the realm of diabetes management, a groundbreaking journey unfolds as scientists step into the creation of a pharmaceutical marvel in the form of gastroretentive floating matrix tablet of mitiglinide.

This tablet, crafted with precision and innovation, holds the promise of transforming how we approach post-meal hyperglycemia in type II diabetes.

## **The Genesis of Gastroretentive Tablets**

Mitiglinide calcium dihydrate (MTG), a slightly acidic insulinotropic meglitinide, offers a unique opportunity to manage post-meal hyperglycemia. Recognizing its optimal absorption in the stomach's acidic environment, scientists seek a solution to enhance its efficacy. The challenge lay in the rapid onset and short duration of

MTG's action, necessitating multiple dosing.

The answer?

Developing a floating gastroretentive extended release formulation of MTG. The goal was clear: extend gastric residence time, control release for improved bioavailability and reduce dosing frequency.

The result is a remarkable creation of floating matrix tablets, a solid dosage form that could redefine diabetes care.

## Design and Preparation / The Artistry of Design and Preparation

The artistry of this pharmaceutical creation lies in the meticulous design and preparation of these tablets.

Scientists employed a 32 full factorial design, utilizing matrix-forming polymers like hydroxypropyl methylcellulose K15M (HPMC K15M) and sodium alginate along with sodium bicarbonate as the gas forming agent. The concentrations of HPMC K15M and sodium alginate became the key factors, influencing floating lag time, drug release time and release percentage. The scientific ballet reached its crescendo with the aid of Design-Expert® software, ensuring a harmonious balance between theory and application.

Validation studies confirmed the model's predictability and a checkpoint batch validated its real-world application.

## The Evaluation and Analysis

As the tablets took form, their physical evaluation demonstrated not only efficient mechanical strength but a floating ability exceeding 12 hours. In vitro drug release studies unfolded a sustained release for 12 hours with most formulations exhibiting over 98% release.



## Compatibility and Design / Balancing Act in Pharmaceutical Creations

In the world of pharmaceutical creations balance and harmony is crucial. A drug excipient compatibility study conducted using Fourier transform infrared (FTIR) confirmed the absence of any chemical interaction between MTG and the polymer. This ensured a seamless compatibility, reassuring both scientists and future users. The statistical ballet of full factorial design revealed the profound impact of HPMC K15M and sodium alginate on floating lag time, drug release time and percentage.

Each factor played its part, contributing to the tablet's characteristics and performance.

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As the curtain falls on this scientific narrative, the MTG gastroretentive tablet takes its place in the spotlight.

Crafted with precision, validated through statistical proofs and performing with grace, this tablet emerges as a promising force in diabetes care. Its potential to linger in the stomach for 12 hours, offering controlled release and improved diabetes management, beckons a new era in pharmaceutical innovations.

The resonance of this scientific achievement lingers, echoing the promise of a brighter future in diabetes care.