

BIOPOLYMER BASED SUSTAINED RELEASE FLOATING BEAD FOR DRUG DELIVERY METHOD FOR PREPARATION

IITM Technology Available for Licensing

Problem Statement

- The **Conventional oral dosage forms (tablets and capsules) lack control over drug delivery**, resulting in fluctuations in blood plasma drug concentrations, which can lead to drug resistance and toxicity.
- These conventional dosage forms cannot be used for stomach-specific sustained release due to their short residence time in the stomach and lack of drug delivery control.
- The **need for prolonged and controlled drug release in the stomach necessitates a solution** to increase Gastric Residence Time (GRT) while avoiding the use of non-biocompatible hydrophobic polymers and wasteful water/oil mediums in drug delivery systems.

Intellectual Property

- IITM IDF Ref. 2105
- IN 412550 - Patent Granted

Technology Category/ Market

Category - Floating Drug delivery

Applications -Advanced material engineering, Floating Drug delivery, Biomaterial

Industry- Pharmaceutical and Biomedical Manufacturing.

Market- The global gastro-retentive drug delivery systems market is expected to grow at a **CAGR of 10.1%** from 2023 to 2033, the market is expected to reach US\$ 24.8 Billion by 2033.

TRL (Technology Readiness Level)

TRL - 4: Technology validated in lab scale.

Research Lab

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Dept. of Applied Mechanics & Biomedical Engineering

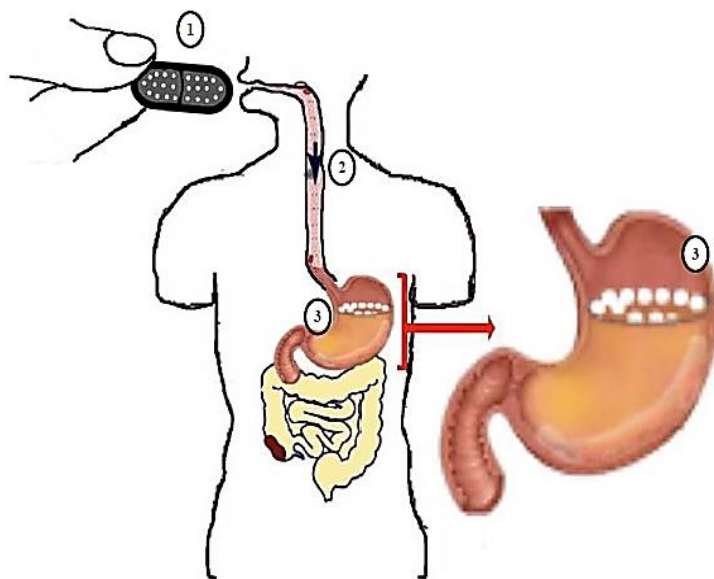


FIG. 2. illustrates the drug delivery mechanism by the biopolymer based floating bead.

Technology

The invention is a **method for preparing biopolymer-based sustained-release floating beads for drug delivery using biomaterials.** (Fig. 1A&B, 2)

- ❑ **Mixing Biopolymers:** Biopolymers, including collagen, chitosan, and collagen-peptide, are mixed together at a specific RPM using a stirrer to create a homogeneous solution.
- ❑ **Homogeneous Solution Processing:** The homogeneous solution is filtered and degassed in a cold environment to ensure uniformity.
- ❑ **Freezing:** The homogeneous solution is released through a syringe into liquid nitrogen for instantaneous freezing, resulting in the formation of frozen beads.
- ❑ **Lyophilization:** The frozen beads are then lyophilized to obtain biopolymer-based floating beads for drug delivery, which can be used for controlled drug release.

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Key Features / Value Proposition

1. Enhanced Drug Delivery:

Our method offers a novel approach to drug delivery through biopolymer-based sustained release floating beads. These beads can effectively release drugs over an extended period, ensuring continuous and controlled drug delivery.

2. Versatile Drug Compatibility:

Our technology is compatible with a wide range of drugs, including antiulcer, antibiotic, antiemetic, antihypertensive, antipsychotic, and anti-tubercular drugs, providing flexibility for various medical applications.

3. Superior Floating Capability:

The biopolymer-based floating beads are designed to float on simulated gastric fluid, ensuring prolonged drug release while maintaining stability in the stomach environment.

4. Innovative Formulation Process:

Our method involves a precise formulation process, including specific RPM mixing, instant freezing, and lyophilization, resulting in the production of high-quality drug delivery beads with improved efficiency and performance.

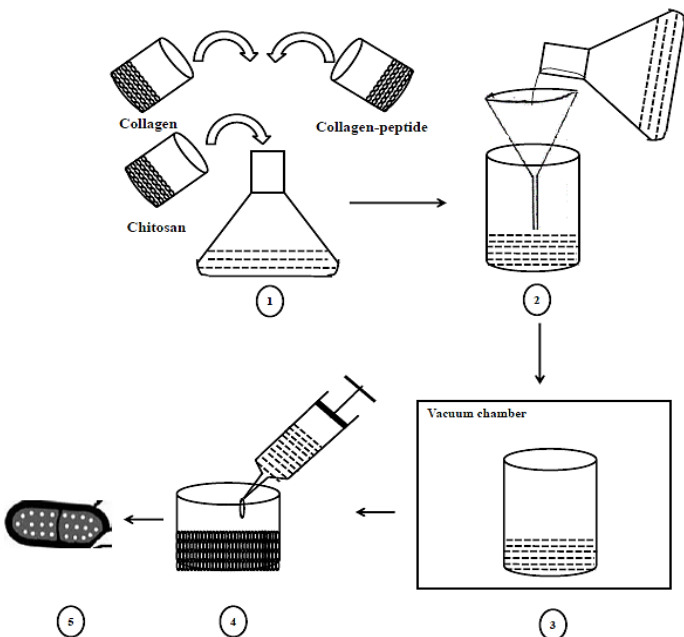


FIG.1A. illustrates a step-by-step process of preparing a biopolymer based sustained release floating bead for drug delivery.

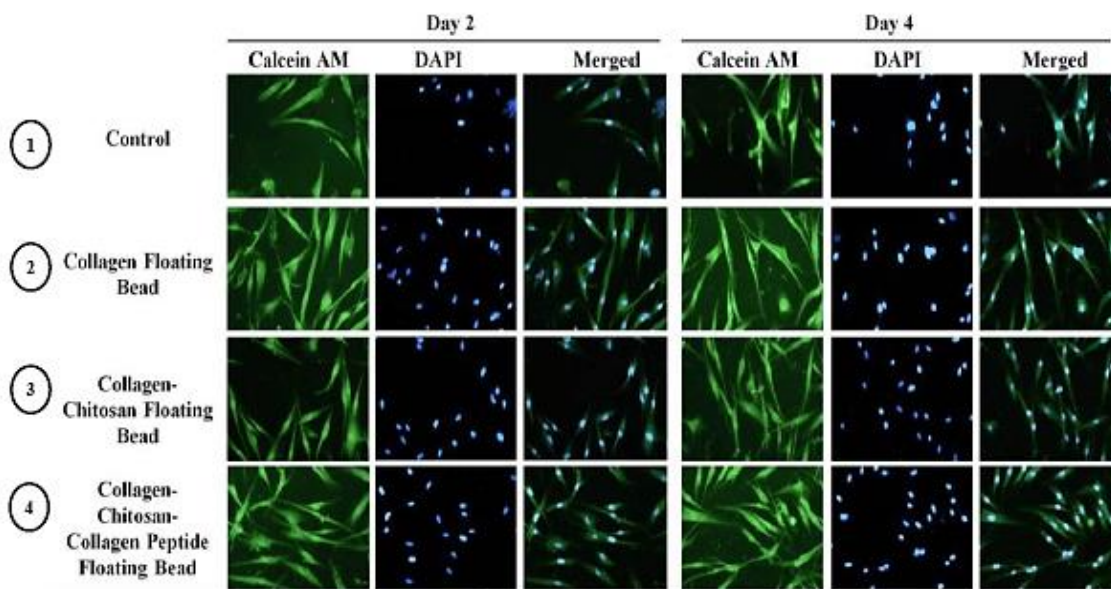


FIG.1B. illustrates characterization of the biopolymer based sustained release floating bead in-vitro toxicity.

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