

### CONJUGATED BETA-GLUCAN NANOPARTICLES FOR TARGETED DELIVERY APPLICATIONS

IITM Technology Available for Licensing

#### Problem Statement

- Need for an enhanced method to prepare  $\beta$ -1,3 glucan (curdlan) nanoparticles efficiently.
- Requirement for improved conjugated beta-glucan nanoparticles for targeted delivery of bioactive elements, pesticides/fertilizers, and food supplements.
- Identifying the necessity for addressing technological gaps in the production and application of beta-glucan nanoparticles for diverse therapeutic and agricultural purposes.

#### Intellectual Property

- IITM IDF Ref. 1722
- IN 370306 - Patent Granted

#### Technology Category/ Market

##### Category - Nanobiotechnology

**Applications** - Pharmaceutical Drug Delivery, Nutraceuticals

**Industry** - Pharmaceuticals and Biotechnology

**Market-** Global Beta-Glucan market was valued at US\$ 535.3 million in 2023 and is projected to reach US\$ 860.4 million by 2030, at a **CAGR of 6.9%**.

#### TRL (Technology Readiness Level)

TRL - 3 , Technology concept formulated.

#### Research Lab

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Dept. of Biotechnology

**Prof. Sampath Kumar T S**

Dept. of Metallurgical & Materials Engineering

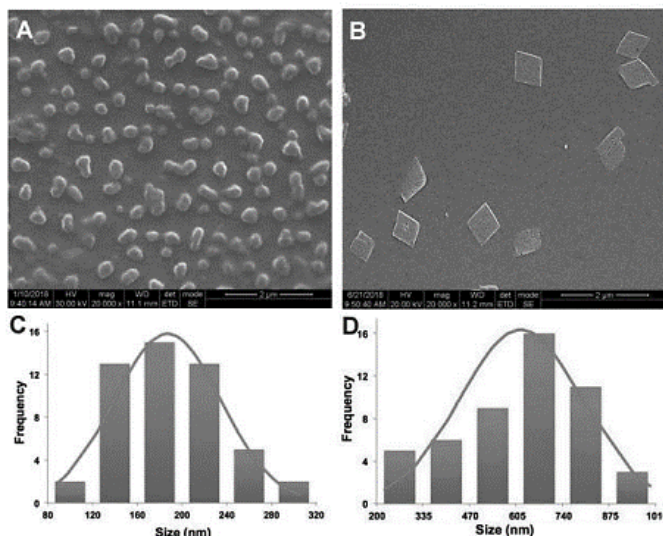


FIG. 1. Graphical representation of SEM micrographs and diameter distribution of (A, C) curdlan and (B, D) Curd-CD nanoparticles.

#### Technology

1

•The method involves dissolving Curdlan in formic acid, then adding it to a water/ethanol solution with Pluronic F-127 to prepare Curdlan nanoparticles. These nanoparticles are precipitated, washed with ethanol, and lyophilized.

2

•Cyclodextrin is conjugated onto the Curdlan nanoparticles using epichlorohydrin. This conjugation allows for the loading of drugs such as Rifampicin and Levofloxacin onto the nanoparticles, forming inclusion complexes.

3

•The drug-loaded nanoparticles exhibit sustained release profiles, with higher loading efficiency and controlled release compared to direct drug loading onto Curdlan nanoparticles. This technology offers potential applications in targeted drug delivery for various therapeutic and agricultural purposes.

#### CONTACT US

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### Key Features / Value Proposition

- 1. Advanced Drug Delivery:** Leveraging conjugated beta-glucan nanoparticles for targeted delivery offers enhanced efficacy and controlled release, addressing critical needs in pharmaceuticals.
- 2. Versatile Applications:** From bioactive elements delivery to agricultural solutions like pesticides/fertilizers, the technology caters to diverse sectors, ensuring broad market penetration and adaptability.
- 3. Improved Efficiency:** Higher loading efficiency and sustained release profiles of drug-loaded nanoparticles signify improved therapeutic outcomes and cost-effectiveness for stakeholders.
- 4. Tailored Solutions:** With customizable drug loading and release profiles, the technology enables tailored solutions for specific medical and agricultural challenges, providing a competitive edge in the market.

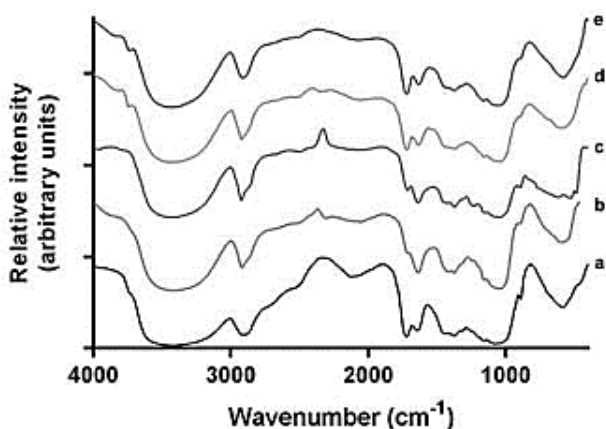


FIG. 2. Graphical representation of FT-IR spectra of the particles. (a) Curdlan NP, (b) Curdlan-CD, (c) CCDR, (d) CCDL and (e) CCDRL.

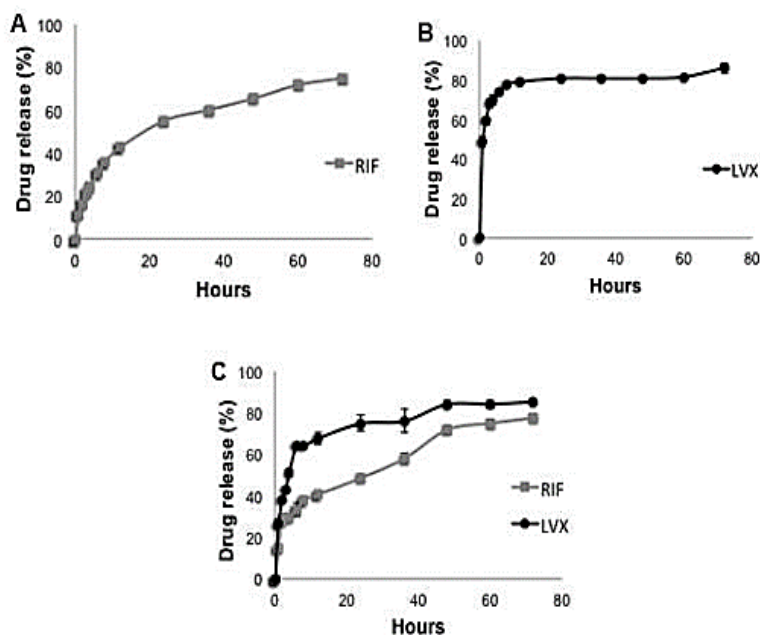


FIG. 3. Graphical representation of drug release profiles of (A) CCDR, (B) CCDL and (C) CCDRL.

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