पेटेंट कार्यालय
शासकीय जर्नल

OFFICIAL JOURNAL
OF
THE PATENT OFFICE

निर्गमन सं. 21/2026	शुक्रवार	दिनांक: 22/05/2026
ISSUE NO. 21/2026	FRIDAY	DATE: 22/05/2026

पेटेंट कार्यालय का एक प्रकाशन
PUBLICATION OF THE PATENT OFFICE

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :15/04/2026
(21) Application No.202611048048 A
(43) Publication Date : 22/05/2026

(54) Title of the invention : A SMART NANO-DRUG DELIVERY SYSTEM FOR ON-DEMAND INSULIN RELEASE USING CHITOSAN NANOPARTICLES

(51) International classification	:B82Y5/00, B82Y30/00, B82Y40/00, A61P3/10, A61K31/722, A61K31/17, A61K38/28, A61K38/44
(31) Priority Document No	:NA
(32) Priority Date	:NA
(33) Name of priority country	:NA
(86) International Application No Filing Date	: :01/01/1900
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

(71)**Name of Applicant :**
1)Ms. Ekta Upadhyay
Address of Applicant :Assistant Professor, School of Pharmaceutical Sciences, Faculty of Pharmacy, IFTM University, Moradabad, Uttar Pradesh, India – 244102 Uttar Pradesh India
2)Mrs. Toshita Mishra Gohil
3)Ms. Neeru
4)Mrs. Priyanka Chaturvedi
5)Ms. Shiwani Vishwakarma
6)Mr. Mohammad Shoeb Khan
7)Ms. Alisha Jabi
8)Mr. Victor Roychowdhury
9)Mrs. Neha Tyagi
10)Ms. Priyanka Bharti
(72)**Name of Inventor :**
1)Ms. Ekta Upadhyay
2)Mrs. Toshita Mishra Gohil
3)Ms. Neeru
4)Mrs. Priyanka Chaturvedi
5)Ms. Shiwani Vishwakarma
6)Mr. Mohammad Shoeb Khan
7)Ms. Alisha Jabi
8)Mr. Victor Roychowdhury
9)Mrs. Neha Tyagi
10)Ms. Priyanka Bharti

(57) Abstract :
The present invention discloses a smart nano-drug delivery system for glucose-responsive on-demand insulin release using chitosan nanoparticles functionalized with glucose oxidase enzyme. The nanoparticles comprise chitosan crosslinked with tripolyphosphate through ionic gelation, encapsulated recombinant human insulin, and surface-conjugated glucose oxidase. Under hyperglycemic conditions, glucose oxidase catalyzes the conversion of glucose to gluconic acid, causing localized pH reduction that triggers swelling of the pH-sensitive chitosan matrix and consequent insulin release. The nanoparticles exhibit particle size of 150 to 300 nanometers, insulin encapsulation efficiency of 70 to 85 percent, and glucose responsiveness ratio of 7.5 fold higher release at hyperglycemic versus normoglycemic glucose levels. In vivo studies in diabetic animal models demonstrate maintenance of normoglycemic blood glucose levels for up to 18 hours following single subcutaneous administration. The invention provides an autonomous, self-regulated insulin delivery system that mimics physiological insulin secretion, reduces hypoglycemic risk, and improves patient compliance in diabetes management.

No. of Pages : 13 No. of Claims : 10