(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :05/11/2025

(21) Application No.202511107078 A

(43) Publication Date : 26/12/2025

(54) Title of the invention : GABAPENTIN LOADED SUSTAINED RELEASE HYDROGEL AND METHOD OF PREPARATION THEREOF

(51) International classification	:B29C 31/06, B43L 23/06, B43L 23/08, H05G 1/44, G04B 21/04	(71)**Name of Applicant :** **1)Prashant Upadhyay** Address of Applicant :School of Pharmaceutical Sciences, IFTM University, Moradabad Uttar Pradesh India **2)Nitish Kumar** **3)Dr. Sukirti Upadhyay** (72)**Name of Inventor :** **1)Dr. Prashant Upadhyay** **2)Nitish Kumar** **3)Dr. Sukirti Upadhyay**
(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	

(57) Abstract :

Gabapentin, a structural analog of GABA, is a first-line pharmacological agent for the treatment of neuropathic pain. However, its therapeutic utility is hindered by poor bioavailability, short biological half-life (5–7 hours), and the need for frequent dosing, which can lead to fluctuating plasma concentrations and reduced patient adherence. The present study focuses on the design, synthesis, and evaluation of a novel sustained-release hydrogel-based delivery system loaded with Gabapentin, aimed at overcoming these limitations and providing consistent analgesic efficacy over an extended period. The hydrogel matrix was developed using a blend of biocompatible and biodegradable polymers including chitosan, and polyvinyl alcohol (PVA), cross-linked with glutaraldehyde to enhance structural integrity and control drug diffusion. Gabapentin was successfully incorporated into the hydrogel network through an in situ loading technique. The formulation was characterized for its physicochemical properties, including drug content, viscosity, swelling ratio, porosity and drug loading efficiency. Fourier Transform Infrared (FTIR) spectroscopy confirmed the compatibility of Gabapentin with polymeric components. In vitro drug release studies, performed in phosphate buffer (pH 7.4) using Franz diffusion cells, demonstrated a biphasic release profile with an initial moderate burst followed by a sustained release of Gabapentin over 72 hours. Kinetic modeling of the release data indicated a non-Fickian (anomalous) diffusion mechanism, suggesting a combination of drug diffusion and polymer matrix relaxation. Prolonged retention of Gabapentin, supporting the hydrogel's potential for transdermal application.

No. of Pages : 18 No. of Claims : 8