PL 11 - Controlled Release of Diclofenac Sodium from Chitosan/Tripolyphosphate Beads

T. Buranachai[(1)], N. Prapairaksit[(2)], N. Muangsin[(3)]

[(1)]Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand - [(2)]Department of Biology, Faculty of Science, Srinakharinwirot University, Bangkok, Thailand - [(3)]Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

The controlled release of diclofenac sodium from chitosan/tripolyphosphate beads was developed. Chitosan beads were modified by the ionic crosslinking method with varying concentration of tripolyphosphate solution. The morphology of chitosan-TPP bead, observed with the Scanning Electron Microscope (SEM), features a relatively spherical shape with smooth surface and integral inside structure with diameter in the range of 1.90-2.20 mm. The rapid swelling and erosion of the beads in acidic condition, normally associated with the pure chitosan, were greatly improved by crosslinking with 1% and 10% tripolyphosphate. Excellent encapsulation was achieved by the obtained beads with over 95% loading efficiency. 10% Tripolyphosphate crosslinked chitosan beads, prepared at pH 6.0 and room temperature, provided the best delayed release in gastric simulated fluid (pH 1.2). The remaining drug content was gradually released within 24 hours in the intestinal simulated fluid (pH 7.4). In all, the chitosan-TPP beads have been proven very useful as a novel alternative for gastrointestinal drug release system.