PAQ-6

ALGINATE-CHITOSAN MICROCAPSULES AS DELIVERY SYSTEMS FOR TRAMADOL

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Chitosan is a biocompatible, non toxic and easily bioabsorbable polymer [1] with gel-forming ability at low pH. Moreover, chitosan has antiacid and antiulcer activities that prevent or weaken drug irritation in the stomach [2]. Chitosan matrix formulations also appear to float and gradually swell in an acid medium.

Encapsulation with alginates is the most often carried out by dispersing the alginate encapsulant solution into a calcium chloride gelation medium. More recently, microcapsules with an alginate gel core and a polyanion-polycation membrane have been suggested as candidates for the oral delivery of a wide range of compounds including drugs [3,4] passing the stomach to intestinal sites of absorption.
Diffusion and swelling are the most important rate-controlling mechanisms of systemic controlled release products [5]. The power law equation of Peppas can be regarded as a generalization of the observation that the superposition of two apparently independent mechanisms of drug transport, a Fickian diffusion and a case II transport [6], describes in many cases the dynamic swelling of drug release from polymers, regardless of the form of the constitutive equation and the type of coupling of relaxation and diffusion [7].

Tramadol is a centrally acting analgesic with low affinity for opioid receptors where it has selectivity for μ-receptors [8]. Its limiting side-effects in the treatment of acute and chronic pain are reported to be less intense and less frequent than with other opioids. A low drug delivery system is particularly suitable for the formulation of an analgesic agent. Tramadol is a good candidate drug to be formulated in a sustained-release dosage form.

The purpose of the current study was to prepare microcapsules for the controlled release of Tramadol hydrochloride by a simple technique that uses alginate-chitosan as a matrix. We studied two different methods of alginate-chitosan capsule formation and their effect on the release of Tramadol hydrochloride from microcapsules.

ACKNOWLEDEMENTS

The authors gratefully acknowledge the financial support from CYTED (Project Nº IV-14), Company IDEBIO S.L. and DSM-DERETIL. A Research Project from the Ministry of Science and Technology of Spain (Ref Nº MAT2000-0037-P4-03) is also recognized. Thanks to Vegal Laboratory by providing us Tramadol.

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