Release of Amoxicillin from Chitosan/PVA Crosslinked Films

Aylin Altinisik\textsuperscript{a}, *Kadir Yurdakoc\textsuperscript{b}

\textsuperscript{a}Dokuz Eylül University, Graduate School of Natural and Applied Sciences, Department of Chemistry, 35160 Izmir-Turkey.
\textsuperscript{b}Dokuz Eylül University, Faculty of Sciences, Department of Chemistry, 35160 Izmir-Turkey. aylin.altinisik@deu.edu.tr

Amoxicillin is an efficient antibiotic drug for the treatment of Helicobacter pylori, the main cause of gastritis and stomach ulcer. Helicobacter pylori are a parasite that resides underneath the mucous membrane of the stomach, avoiding attack by strong acid, which no bacteria can survive [1,2]. About 40\% of the population is reported to be infected by this bacterium, with approx. 10\% of those suffering from a resulting digestion ulcer. Amoxicillin has been loaded in and released from several polymeric delivery systems for its site-specific delivery in the stomach. One of them involves polyionic complexes of chitosan and polyacrylic acid. The release of amoxicillin accompanied by the swelling of the polymeric system is mainly governed by the degree of ionization [3].

Release properties of amoxicillin were investigated by using chitosan [4] or carboxyl vinyl polymer [5], chitosan–poly (acrylic acid) [6], poly (acrylic acid)–poly (vinyl pyrrolidone) complexes [7]. The drug-release pattern was mostly controlled by the mucoadhesive properties of the microspheres on the gastric mucous layer [3, 7]. In order to establish a prolonged release of a drug in the stomach, a long retention time of the drug carrier is a prerequisite. To accomplish this long retention time, high and fast swelling properties of the drug carrier in acidic conditions are required for its stable suspension. One of the promising materials to attain this sustained release is a porous hydrogel that can absorb high levels of water in a short time to expand its volume considerably without dissolution by the presence of large pores in a 3-dimensional network structure.

In this study, cross-linked chitosan hydrogels synthesized with PVA and tartaric acid. The drug-release pattern was analyzed and compared with other drug-carrying systems. Drug-release experiments were conducted for the drug-dispersed hydrogels. The drug-loaded sample was placed in simulated gastric fluid (SGF, pH=1.2) with continuous stirring at 37 °C. The equilibrium concentration of amoxicillin in SGF solution was measured spectrophotometrically by using a UV-Vis spectrophotometer with two different methods. The new determination method of amoxicillin was also modified and developed for the reproducible measurements. It was found that oxidation method was simpler, faster and more sensitive than direct method and reported methods.

REFERENCES