# Evaluation of the Use of Chitosan in Ocular Drug Delivery of Vancomycin

**Anutra Khangtragool[1*], Somsanguan Ausayakhun[2], Phuriwat Leesawat[3], Robert Molloy[4] and Chutiporn Laokul[4]**

*[1]Division of Pharmacy, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand*

*[2]Department of Ophthalmology, Maharaj Nakorn Chiang Mai Hospital, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand*

*[3]Department of Pharmaceutical Science, Faculty of Pharmacy and Biomedical Engineering Center, Chiang Mai University, Chiang Mai 50200, Thailand*

*[4]Biomedical Polymers Technology Unit, Department of Chemistry, Faculty of Science; Chiang Mai University, Chiang Mai 50200, Thailand*

**Corresponding author. E-mail: akhangtr@mail.med.cmu.ac.th*

## ABSTRACT

***In this study, the physicochemical properties of chitosan and its use in the ocular drug delivery of vancomycin were evaluated. The physicochemical properties of the chitosan used were characterized in terms of moisture content, degree of deacetylation (DD) and viscosity-average molecular weight ($\overline{M}_v$) and were found to be 13.5%, 94.0% and 6.03 x $10^5$, respectively. The vancomycin 50 mg/ml was prepared by reconstituting with Tears Naturale II™, 0.9% sodium chloride and 0.1% and 0.3% chitosan solutions. The antimicrobial potency was measured by the minimum inhibitory concentration against Staphylococcus aureus. The stabilities of the solutions were evaluated by measuring their UV absorption and pH.***

***The results of this study showed that vancomycin 50 mg/ml eye drops in 0.1% and 0.3% chitosan solutions were stable for 28 days when stored at 2-8°C.***

***The main conclusion to be drawn from this study is that the 0.1% and 0.3% chitosan solutions may be useful for the ocular drug delivery of vancomycin due to their biocompatibility, storage stability and cost effectiveness.***

**Key words:** Vancomycin hydrochloride, Chitosan, Eye drops, Storage stability

## INTRODUCTION

Bacterial keratitis is one of the most threatening ocular infections (Schaefer et al., 2001; Keay et al., 2006). Successful therapy of bacterial keratitis must be able to rapidly attain drug concentrations at the site of infection. Since the cornea is not vascularized, it is not readily permeated by systemically-administered drugs,