UNIVERSITI TEKNOLOGI MARA

VISCOSITY MODIFYING PROPERTIES OF CITRATE COMPOUNDS

SYAKINAH MOHD SHUKRI

Dissertation submitted in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy (Hons)

Faculty of Pharmacy

October 2006

ACKNOWLEDGEMENTS

First and foremost I would like to express my appreciation to those who have helped in the completion of this research project. I owe a special debt of gratitude to my supervisor Dr. Wong Tin Wui for the supervision and critical appraisal for this manuscript. I am sincerely appreciating his contribution of knowledge, advice, encouragement and support regarding this project. I also would like to thank to all the lectures of Faculty of Pharmacy that involved directly or indirectly in completing this project. In this regard I am also would like to express my deep gratitude to all postgraduates and laboratory assistant for their tolerance and cooperation in completing this project. To each of them a special thanks. Besides, I also want to thank my family members for their unconditional support and love, and for their sharing with me the belief that my efforts are worthwhile and useful. Finally, I would like to thank to all my friends for their support and encouragement in completing this dissertation.

TABLE OF CONTENTS

ABSTRACT

AIM: This study reported the effects of citrate based additives on the viscosity profile of hydroxypropylmethylcellulose (HPMC) solution.

METHOD: The HPMC solution, with or without the incorporation of additives, was subjected to viscosity test using a U-tube viscometer at 30°C. Selected samples of test solutions were subjected to Fourier Transform Infrared spectroscopy (FTIR) analysis.

RESULTS: The viscosity of HPMC solutions was reduced when appropriate amounts of citric acid, triacetin, triethyl citrate and trisodium citrate were added. Using 0.5% (w/w) HPMC solution, small molecular weight additive such as citric acid demonstrated the best viscosity lowering effect when an appropriate amount of citric acid was added. Using 1% (w/w) HPMC solution, trisodium citrate demonstrated the best viscosity lowering effect when an appropriate amount of trisodium citrate was added. FTIR analysis indicated that the viscosity profile of HPMC solution could be mediated through the interaction of additives with HPMC via O-H or non O-H functional groups of the polymer.

CONCLUSION: Citric acid, triacetin, triethyl citrate and trisodium citrate exhibited viscosity modifying properties in HPMC solution.

CHAPTER 1

INTRODUCTION

Hydroxypropylmethylcellulose (HPMC) is a non-ionic, water-soluble cellulose ether derivative prepared by processing pulp cellulose with caustic soda followed by reaction with methyl chloride and propylene oxide for methyl and hydroxypropyl substitution respectively. It show good stability in the presence of heat, light and moisture and chemical resistance over a wide pH range (Chan et al., 2003). HPMC is widely used in controlled-release dosage forms because of its nontoxic nature, its capacity to accommodate high levels of drug loading, and its non-pH dependence property with respect to drug release profile of matrix mode of HPMC (Amaral et al., 2001).

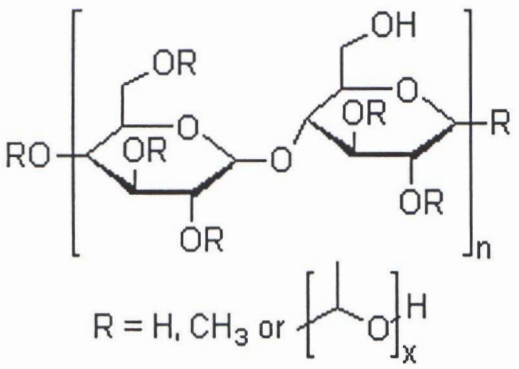

Figure 1.1 Chemical structure of hydroxypropylmethylcellulose