UNIVERSITI TEKNOLOGI MARA

THE TACK MODIFYING EFFECTS OF CITRATE COMPOUNDS ON HYDROXYPROPYLMETHYLCELLULOSE SOLUTION

NUR MARIANA AYUB

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

Faculty of Pharmacy

October 2006

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank the people who have helped to make this dissertation possible. I am extremely grateful to my supervisor Dr. Wong Tin Wui who continuously gives advice, information and support regarding to the dissertation. All his advice encourages me to give extra commitment in conducting the research work. My family members have also been involved, not least in their patience and support. I also wish to acknowledge my friends especially to my laboratory mate, Syakinah and Mohd. Radzi who have helped me during the practical session as well as the post-graduate students and the laboratory assistants. My thanks go to them for steering me through some of the practical problems and always being available to answer questions when they arose.

TABLE OF CONTENTS

ABSTRACT

The study sets to determine the effects of plasticizers on the tackiness of the hydroxypropylmethylcellulose (HPMC) solution. The HPMC solution, without or with the incorporation of plasticizers, was subjected to the tack measurement by using the torsion balance at 30°C. The plasticizers used were citric acid, triacetin, triethyl citrate and trisodium citrate. The blank HPMC and plasticizer loaded HPMC solution were subjected to molecular spectroscopy analysis by mean of Fourier Transform Infra-red Analysis. All plasticizers could modify the tack of 0.5% w/w HPMC solution. Nonetheless, none of the plasticizers could reduce the tack of HPMC solution to a value lower than that of the blank solution. The tack of plasticizer-added HPMC solution was mediated from the interaction between the polymer and/or plasticizer molecules, typically via the O-H functional groups. Citric acid, triacetin, triethyl citrate and trisodium citrate could not effectively reduce the tack force of 0.5% w/w HPMC solutions.

CHAPTER 1

INTRODUCTION

Hydroxypropylmethylcellulose (HPMC) is a methylcellulose modified with a small amount of propylene glycol ether groups attached to the anhydroglucose of the cellulose. It is an aqueous soluble polymer commonly used for film coating and stable in the presence of heat, light, air and moisture. Films of this polymer are flexible, able to tolerate the presence of additives and are resistant to abrasion (Heng et al., 1996). HPMC is a macromolecule and it tends to be surface active (Machiste and Buckton, 1996).

HPMC demonstrates relatively slow dynamic surface activity and may serve as a stabilizer in emulsions and suspensions (Avranas and Iliou, 2003). The molecules preferentially adsorb at the liquid-air interface and lower the solution surface tension (Machiste and Buckton, 1996). HPMC is a polymer frequently used in the formulation of controlled release dosage forms. The mechanism by which it retards drug release includes its ability to rapidly form a gel layer at the matrix periphery exposed to aqueous fluids (Gonzales and Robles, 2003). The hydrophilic and swelling characteristics of HPMC particularly desirable for formulation of prolonged-release matrix tablet (Mora et al., 2006).