

UNIVERSITI TEKNOLOGI MARA

**EFFECTS OF CITRATE BASED ADDITIVES ON
THE VISCOSITY PROFILE
OF HYDROXYPROPYLMETHYLCELLULOSE
SOLUTION**

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ABSTRACT

AIM: This study sets to investigate 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 rotatory viscometer and at a solution temperatures of 30 to 60°C unless otherwise stated. The additives used were trisodium citrate, citric acid, triethylcitrate and triacetin.

RESULT: The viscosity of aqueous HPMC solutions was reduced when appropriate amounts of trisodium citrate, citric acid, triethylcitrate and triacetin were added. Using 1% w/w HPMC solution, triethylcitrate demonstrated the best viscosity lowering effect when solution temperature of 30 to 50°C were concerned while trisodium citrate exhibited a marked viscosity lowering property at 60°C. Using 1.5% w/w HPMC solution, smaller additive such as citric acid gave rise to the most prominent viscosity lowering property.

CONCLUSION: Trisodium citrate, citric acid, triethylcitrate and triacetin exhibited viscosity lowering property 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 (Fu *et al.*, 2004) (Fig.1). HPMC is widely used as a film former in aqueous coating of solid dosage forms since it forms strong, reasonably flexible and scratch resistant films (Chan *et al.*, 2002). It is stable in the presence of heat, light, air and moisture (Heng *et al.*, 1996). HPMC has many other uses as a emulsifier, thickening agent, stabilizer, gellant, and suspending agent (M.E. Aulton., 2002). It forms films upon drying and undergoes reversible transformation from solution to gel upon heating and cooling (Alfred Martin., 1993). Rheological studies showed that solutions of HPMC with a polymer concentration less than 3.0 % w/v did not form gels and exhibited Newtonian flow pattern at 25°C (Hino and Ford., 2001).