UNIVERSITI TEKNOLOGI MARA

THERMAL ANALYSIS OF HYDROXYPROPYLMETHYLCELLULOSE AND CITRATE BASED ADDITIVES IN SOLUTION

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ABSTRACT

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

METHOD: The HPMC solution, with or without the incorporation of additives, was subjected to thermal analysis using thermogravimetric analysis (TGA) machine. The sample was heated up from 20 to 350°C with heating rate at 40°C/min and nitrogen purges at 40 ml/min.

RESULTS: For 0.5% (w/w) HPMC solution, weight loss percentage of HPMC solution generally decreased with addition of all plasticizers and further reduced if greater amount of plasticizers introduced, except for citric acid. In the case of 1% (w/w) HPMC the addition of small amount of citric acid, triacetin and triethyl citrate caused an increase in weight loss percentage but the addition of trisodium citrate caused a decrease in weight loss percentage. Citric acid, triethyl citrate and trisodium citrate showed an increased in weight loss percentage but a decreased for triacetin loaded HPMC solution if higher amounts of plasticizers used. Addition of small amount of all plasticizers in 0.5% HPMC solution caused an increase in onset weight loss temperature of the solution but showed a decreased in onset weight loss temperature if high amount of citric acid used. For 1.0% HPMC solution, addition of all plasticizers except for trisodium citrate in a small amount caused a decreased in onset weight loss temperature while higher amounts of triacetin and trisodium citrate caused an increase in onset weight loss temperature.

CONCLUSION: Addition of citric acid, triacetin, triethyl citrate and trisodium citrate gave variety of effects on thermal profile of HPMC solution depending on amounts and types of additives as well as concentration of the polymer.

CHAPTER 1

Introduction

1.1 Introduction

Hydroxypropylmethylcellulose (HPMC) is a non-ionic, water soluble cellulose ether derivative that is reacted with methyl chloride and propylene oxide (Organic Materials Review Institute, 2002). HPMC can forms strong, flexible and scratch resistant films hence it is widely used as a film former in aqueous coating of solid dosage forms (Chan et al., 2003). It is also used as an emulsifier, thickening agent, suspending agent and stabilizer. HPMC is extensively used as a matrix for drug delivery, in building materials, for dye and paint removal, in adhesives, cosmetics, coating processes and in the agricultural and textile areas (Zaccaron et al., 2005). HPMC is stable in the presence of heat, light and moisture (Heng *et al.,* 1996; Wong et al., 2002; Wang *et al.*, 2005).

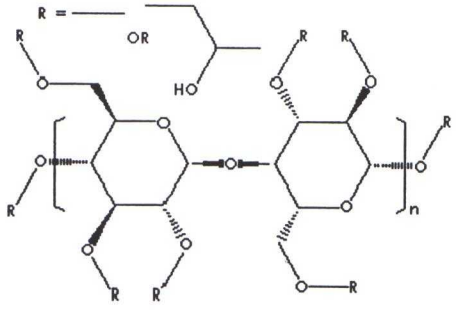

Figure 1.1: Chemical Structure of HPMC