

Optimization of Reaction Conditions for Hydroxypropylation of Saba Banana Starch

ABSTRACT

The aim of this study was to investigate the effects of three reaction variables on the hydroxypropylation of Saba banana (*Musa acuminata* x *Musa balbisiana*) starch. The variables were reaction pH (10, 11 and 12), amount of propylene oxide (5, 10 and 15% v/w) and reaction temperature (35, 40 and 45 °C). Response Surface Methodology (RSM) using Central Composite Design was employed to explore the effects of these three variables on the Molar Substitution (MS), pasting properties, freeze-thaw stability and thermal properties of the modified starch. Increasing the amount of propylene oxide, pH and temperature promoted higher level of substitution. All three factors were found significantly ($p < 0.05$) influenced the MS. These factors also affected the pasting temperature, peak viscosity, breakdown, setback and freeze-thaw stability of the starch pastes. The experimental factors only affected the onset temperature, peak temperature and gelatinization enthalpy of modified starches. In general, propylene oxide exerted the most pronounced effect on hydroxypropylation of Saba banana starch as compared to the reaction pH and temperature. The optimal reaction conditions for hydroxypropylation of Saba banana starch was successfully optimized and validated.