##C526786 :MAJOR FOOD TECHNOLOGY
KEY WORD: TAPIOCA STARCH/TWIN-SCREW EXTRUSION COOKING PROCESS/MALTODEXTRINS
JIRARAT TATTIYAKUL : PRODUCTION OF MALTODEXTRINS FROM TAPIOCA STARCH USING THERMOSTABLE ALPHA-AMYLASE. THESIS ADVISOR : ASSO. PROF. PATCHAREE PANKUN, Ph.D., CO-ADVISOR : MR.PRACHA BOONYASIRIKOON, LECTURER. 152 pp. ISBN 974-584-878-6

This research aimed to study the production of maltodextrins from tapioca starch using thermostable alpha-amylase in conventional batch process and twin-screw extrusion cooking process. In conventional batch process, the samples of 30%(w/w) tapioca starch slurry adjusted to pH 6.5 were treated by alpha-amylase. Alpha-amylase concentrations(X1), temperature(X2), and time(X3) were ranged at 0.01-0.10%(v/w), 80-90 degree celcius, and 40-120 minutes, respectively. Dextrose Equivalent (D.E.) values (Y) of the maltodextrins were determined after inhibiting enzyme activity and purifying. Response Surface Methodology (RSM) was used to optimize processing conditions. The second order polynomials model was fitted to illustrate the relationship between D.E. value (Y) and the three variables as following :

$$Y = -301.8919 + 385.0736X1 + 6.5818X2 + 0.2949X3 - 2248.8541X1^2 - 0.0368X2^2 - 0.0013X3^2 + 0.4136X1X3 \quad (1)$$

In twin-screw wxtrusion cooking process, the tapioca starch samples of varied moisture content(X1) at 30-40%(v/w) were cooked in extruder with 4.8 kilograms per hour feed rate and 150 rpm. screw rotational rate. Alpha-amylase concentration(X2) and dough temperature (X3) were ranged at 0.01-0.10% (v/w) and 120-130 degree celcius, respectively. D.E. values(Y) of the malto-dwxtrins were determined after inhibiting enzyme activity and purifying. The second order polynomials model was fitted by using RSM to illustrate the relationship between D.E.value (Y) and the three variables as following :

$$Y = -491.8243 + 13.0743X1 + 792.9028X2 + 3.9112X3 - 737.3810X2^2 - 0.1035X1X3 - 4.7770X2X3 \quad (2)$$

Model (1) and (2) were used in predicting processing conditions and gave 98.78±0.41 and 92.57±1.34 % accuracy, respectively. The maltodextrins produced from both processes were identical in their saccharides profile. As concentrated maltodextrins with 32-48% total soluble solid, they were also identical in rheological properties which were the same as vegetable oil. These concentrated maltodextrins being used to substitute vegetable oil in salad dressing up to 50% substitution showed no significant difference ($p>0.05$) in texture and taste.