

SOMKIAT KIATKITTIGUL : MODIFICATION OF TAPIOCA STARCH BY CROSS -
LINKING AND OXIDATION . THESIS ADVISOR : ASSIST. PROF. VANNA
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This research studied the modified conditions for the preparation of modified tapioca starch by cross-linking and oxidation reactions. Tapioca starch (40% W/V) was first modified by cross-linking with sodium trimetaphosphate ($\text{Na}_3\text{P}_3\text{O}_9$) at pH 11.00 ± 0.10 and $50 \pm 2^\circ\text{C}$. It was found that both concentration of $\text{Na}_3\text{P}_3\text{O}_9$ and reaction time had significant interaction effect ($p < 0.05$) on the Brabender viscosity as well as the difference of viscosity of paste in heating-cooling cycle. Increasing concentration of $\text{Na}_3\text{P}_3\text{O}_9$ (0.20 to 0.30% by weight of dry starch) and reaction time (4 to 6 hrs.) decreased the Brabender viscosity and the difference of viscosity of paste in heating-cooling cycle. The cross-linked tapioca starch was stable in heating-cooling cycle and had less solubility and swelling power than the native tapioca starch. The cross - linked tapioca starch which had the highest paste stability in heating-cooling cycle was chosen for modification by oxidation reaction.

The cross-linked tapioca starch (40% W/V) was modified by using sodium hypochlorite (NaOCl) at pH 9.00 ± 0.10 and at room temperature. It was found that the modified tapioca starch had higher paste viscosity than the cross - linked tapioca starch. Both concentration of NaOCl and reaction time had significant effect ($p < 0.05$) on the Brabender viscosity and the difference of viscosity of paste in heating - cooling cycle. Increasing concentration of NaOCl (3.00 to 5.00 % by weight of dry starch) and reaction time (4 to 6 hrs.) reduced the paste viscosity while increased solubility and swelling power. The double modified tapioca starch had high hot paste stability, less retrogradation and was able to absorb more water.

Concentration of starch also had an effect on the stability of paste in heating - cooling cycle. It was found that $\leq 5.00\%$ (W/V) native tapioca starch would give good paste stability while up to 8.00 % (W/V) of the double modified tapioca starch could be used to give a paste with good stability when stored at 25°C for 3 days.