

Janya Muadklay 2006: Effects of Xanthan Gum, Freezing Rate and Storage Temperature on Stability of Tapioca Starch Gels. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Assistant Professor Sanguansri Charoenrein, Ph.D. 139 pages.  
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Retrogradation in frozen starch gels were affected by hydrocolloids addition, freezing rate and storage temperature. This research purposed to study effects of freezing rates (slow, medium and fast), storage temperatures (-12 °C and -18 °C) and addition of xanthan gum (0.00, 0.25 and 0.50 % in 5 % total solids) on the stability of frozen tapioca starch gels. In texture measurement, gel which was added 0.25 % xanthan gum significantly reduced maximum force more than gels which were added 0.50 and 0.00 % xanthan gum, respectively. The pasting characteristics determined by Rapid Visco-Analyzer (RVA) showed that addition of xanthan gum resulted in significant increased peak, trough and final viscosities but decreased in breakdown and setback. These results assumed that xanthan gum affected the texture changes. Because of phase changing in the starch-xanthan gum systems or the phase-separated networks structure in the gels. After freezing and storage, analysis of retrogradation of starch gels determined by syneresis and the difference of lightness values indicated that fast freezing rate resulted in retard starch retrogradation more than medium and slow freezing rate, respectively. Addition of 0.50 % xanthan gum could retard starch retrogradation more than that of 0.25 % and 0.00 %. Therefore, the best condition for reduction of starch retrogradation of was addition 0.50 % xanthan gum with fast freezing rate. Because syneresis and the difference of lightness values for this condition was lower than the other conditions during storage time (0, 10, 17, 31 and 91 days). Similar result was also found in study by freeze-thaw cycle process (FTC process), gel which was added 0.50 % xanthan gum with fast freezing rate could reduce starch retrogradation and texture changes more than the other samples. The difference storage temperatures, texture of gels, syneresis and the difference of lightness values at -12 °C did not differ from at -18 °C. It was possible that these temperatures were under glass transition temperature ( $T_g$ )

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