

Orawan Tatirat 2006: Effects of Freezing and Konjac Glucomannan on Stability of Frozen Rice 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. 134 pages.
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During freezing and frozen storage, syneresis and texture changes of rice starch (high amylose) gels are commonly observed. Both of macroscopic changes have been widely attributed to starch retrogradation. The objective of this research was to study rice starch gel systems in the presence of 0.0% 0.3% and 0.5% konjac glucomannan. Gels were frozen at different rates (slow, medium and fast rates) and then stored at -12 and -18 °C during 0 to 90 days. Syneresis, texture and amylopectin retrogradation were investigated to determine the gel stability. Freezing rate and konjac glucomannan affected the stability of frozen rice starch gels. For rice starch gels with or without konjac glucomannan, increasing freezing rate could reduce syneresis, texture changes, spongy structure formation and retrogradation of amylose and amylopectin. Increasing konjac glucomannan addition was also increase the stability. Moreover, the effect was clearly at slow freezing rate. In this case, addition of 0.5% konjac glucomannan had lower syneresis values, texture changes and spongy structure formation levels than 0.3% and 0.0% respectively; however, konjac glucomannan did not retard amylopectin retrogradation. It is probable that konjac glucomannan suppressed the aggregation of amylose molecules by defection in discontinuous phase of gel structure. At storage temperature -12 and -18 °C under the glassy state, syneresis values, spongy structure formation levels, cohesiveness values, maximum force values and amylopectin retrogradation were not different. For each of treatments, storage time did not significantly affect the stability of frozen rice starch gels. In this research, addition of 0.5% konjac glucomannan with medium or fast freezing rate was not only the best treatment to maintain the stability of rice gels, but also gel texture form those treatments were similar to fresh rice gel.

Student's signature

Thesis Advisor's signature