

Varatip Prasitnarai 2009: Starch Isolation from Broken Rice by High-Intensity Ultrasound and Deep Freezing. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Sanguansri Charoenrein, Ph.D. 136 pages.

The purposes of this study were to use High-intensity ultrasound (HIU) and deep freezing (DF) as an alternative method to isolate rice starch from broken rice instead of using chemical extraction. Anyhow, suitable condition for extraction was bringing 1:2 ratios of rice flour slurry through extraction by HIU at 50, 70 and 90%amplitude for 15 30 and 45 min. The isolation by 1 and 6 cycles deep freezing (DF) and by HIU together with 6 cycles DF found that the results of each HIU treatment showed that their starch yields were not significantly different ($p > 0.05$) and varied from 74.88 to 80.12% and were not significantly different with starch isolation by HIU treatment at 70% amplitude for 30 min combination with 6 cycles DF. However, the starch yields by HIU treatment were significantly higher than alkaline extraction method. The HIU at 70% amplitude for 45 min could reduce protein content of rice flour from 7.0% to 0.88% which was not significantly different ($p > 0.05$) with protein content of rice starch by alkaline extraction method which had protein content below starch isolation by HIU treatment combination with DF method. The structural examination by confocal laser scanning microscopy confirmed the decreasing protein content of HIU treated samples. In addition, the damage starch of HIU treated samples gradually increased when %amplitude and time increased and at 70%amplitude for 45 min had the degree of damage starches similar to rice starch by alkaline extraction method. For pasting properties, the result found that when %amplitude and time increased, peak, trough and final viscosity decreased while breakdown, setback and peak temperature increased except at 90% amplitude that has peak, trough and final viscosity, breakdown and setback decreased. While peak temperature increased because at this condition, there was gelatinization in rice starch and the best condition for isolating broken rice starch was at 70% amplitude for 45 min that had protein content and damage starches similar to rice starch isolation by alkaline extraction method. Moreover, HIU method could more reduce the amount of waste water and time length used in isolation than alkaline extraction method.

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Thesis Advisor's signature

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