



## **Research Report**

# **Effect of Pregelatinization on Properties of Starch Blends**

**Taewee Karrila, Seppo Karrila  
and Long Hong Nga**

**This research has been funded by Faculty of Science and  
Technology: SAT-ASEAN Research Funding, budget year-2559,  
contract number: SAT600912S.**

**Prince of Songkla University, Pattani Campus**

## ABSTRACT

A binary blend of two common starches was studied by manipulating two factors, namely ratio of starch components and alternative orders of processing. In the first part of the study, native starch blends were generated by mixing native cassava starch and native rice starch. Their cassava contents were adjusted to 0%, 10%, 30%, 50%, 70%, 90% and 100% by dry weight.

The pasting properties of native starch blends are determined by the blend proportions, and some non-additive behavior was observed in gel hardness; and in setback and trough viscosities during pasting. The blends of native cassava starch and native rice starch did not show any significant differences in swelling power or solubility, except for the swelling power at 90 °C that increased with cassava content. Total gelatinization energy dropped sharply when a small amount of one starch was added to the other.

In the second part, the native starch blends from the first part were drum dried from initial 45% solids to pregelatinize them. These were labeled MP starches for "mixing before pregelatinizing". The alternative PM type starches (for "mixing after pregelatinized") were created by mixing pregelatinized rice and pregelatinized cassava, which were drum dried separately under similar conditions. The ratios of the blends were to 100:0, 90:10, 70:30, 50:50, 30:70, 10:90 and 0:100. The PM and MP type pregelatinized blends were compared especially at same blend proportions to determine effects of the processing alternatives: mix first or pregelatinize first. The results showed that both the order of mixing and pregelatinizing and the ratio of starch components had large effects on pasting properties and solubility of a binary starch blend. The study also confirmed interactions during pregelatinizing a mixture of different native starches.

Pregelatinized rice starch was blended with native cassava or rice starch as the same ratio as in part 2. Pasting and textural properties were tested. The results showed that pasting viscosities of the blends were fallen in between PR and CS. Additionally, gel syneresis of the blends were improved as CS content increased.

Blending between PR/R showed very small changes in their pasting and gel properties.

**Keywords:** Starch blends, cassava starch, rice starch, non-additive effect