



# Study of viscosity of mixed flour (rice, tapioca and arrowroot flour) and application in Thai desserts.



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## Abstract

This research investigated the viscosity of starch gel. In order to be able to apply the dough to the desired product. A popular tool for investigating the viscosity and return of starch is the Rapid Visco Analyzer (RVA) and tolerate intense agitation. It can measure the viscosity of starch when temperature changes. Therefore, we studied the use of three types of flour mixed with rice, tapioca and arrowroot flour. Each formula was varied by using Mixture Design. Peak Time, Peak Temp, and Trough values of rice flour were highest. The next is the arrowroot flour. And tapioca flour were lowest. Breakdown value of rice flour is lowest but the tapioca and Arrowroot flour most valuable. However, the Final Viscosity, Setback from Peak, Setback from Trough of flour and Pasting Temp most valuable. The tapioca flour is not different from the arrowroot flour. Rice flour has no effect on viscosity. It affects the texture of the gel. The rice flour gave the hard gel and the opaque color with the highest value of setback from trough. Tapioca and arrowroot flour gave the appearance of a soft and clear gel. Arrowroot flour provides gel that is stronger than tapioca flour but the gel is softer than the rice flour gel. This shows that the three types of starch will give different gel. Replacing the other starch in the product may cause the appearance of the product to be different.

## Introduction

The flour used to make Thai desserts are many kinds. But the choice of each type of flour will vary according to the characteristics of any kind of dessert. Because some types of desserts may use more than one type of flour mixed in different proportions. To get the desired treats, such as Layer Sweet Cake (Kanom Chan) use tapioca starch is the main ingredient then Mix the rice flour with arrowroot flour. The stickiness of Layer Sweet Cake (Kanom Chan) made from tapioca flour but do not be too sticky because of the need to peel off each other, so reduce the sticky by mixing with rice flour. The arrowroot flour helps to make the cake look very clear. The viscosity is difficult to recover. Therefore, viscosity and mechanical properties were investigated. This will make you aware of the similarity and differentiation kinds of starch. To be able to apply the product to the desired specifications. A popular tool for investigating the viscosity and return of starch is the Rapid Visco Analyzer (RVA). And tolerate intense agitation. The study of texture of flour gel, such as Texture profile analysis, makes it possible to use various types of starch as appropriate.

## Objective of the study

The purpose is to allow the dough to be applied to the product exactly as desired. Alternatively, alternate starch can be used. It will also benefit the development of Thai desserts. And other manufacturing processes.

## Methods

- To study the effect of type and quantity of starch ingredients on quality of Thai desserts.
- A: Rice Flour, B: Tapioca Flour, C: Arrowroot Flour
- Adjust the percentage of starch by using the Simplex Lattice, Degree 3 Mixture Design.

Table 1. Thai dessert recipe from Mixture Design Simplex Lattice, Degree 3 of Rice, Tapioca and Arrowroot flour.

Recipes	Flour Content		
	A	B	C
Treatment 1	0.00000	0.66667	0.33333
Treatment 2	0.66667	0.16667	0.16667
Treatment 3	0.33333	0.00000	0.66667
Treatment 4	0.66667	0.33333	0.00000
Treatment 5	0.00000	0.00000	1.00000
Treatment 6	0.33333	0.66667	0.00000
Treatment 7	0.00000	0.33333	0.66667
Treatment 8	0.66667	0.00000	0.33333
Treatment 9	1.00000	0.00000	0.00000
Treatment 10	0.16667	0.16667	0.66667
Treatment 11	0.00000	1.00000	0.00000
Treatment 12	0.16667	0.66667	0.16667
Treatment 13	0.33333	0.33333	0.33333

Rapid visco analysis was used to analyze by Minitab 18. To find a relationship. Using linear

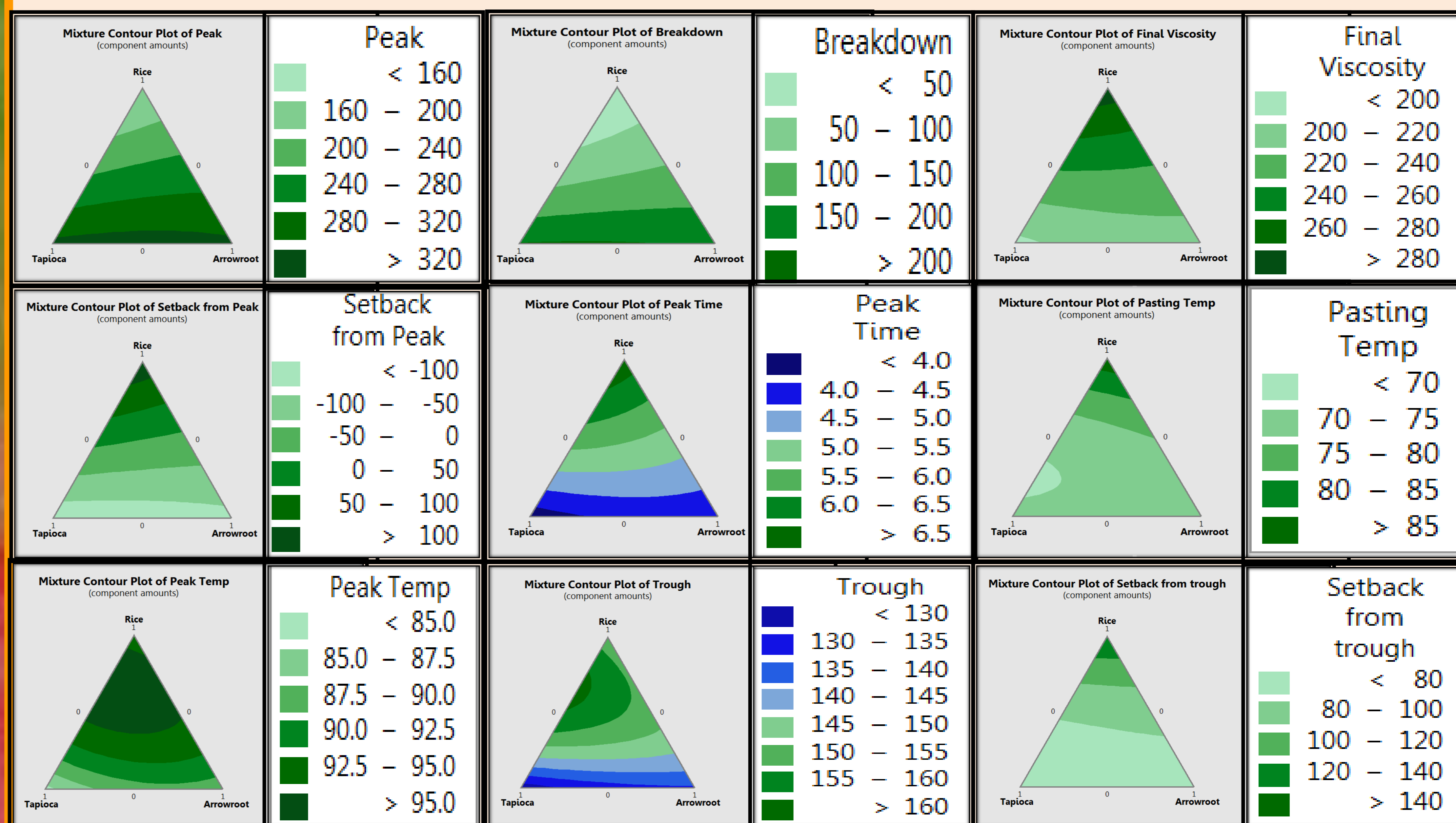
$$Y_i = \beta_1 \cdot 1 + \beta_2 \cdot 2 + \beta_3 \cdot 3 + \beta_{12} \cdot 1 \cdot 2 + \beta_{13} \cdot 1 \cdot 3 + \beta_{23} \cdot 2 \cdot 3$$

## Reference

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- Pitiporn Ritthiruangdej, Thongchai Suwonsichon, Vichai Haruthaithanasan and Klanarong Sriroth. (2003). *Pasting Behavior and Mechanical Properties of Thao Yai Mom Flour (Tacca leontopetaloides Ktze.)*. Kasetsart University.

## Results and Discussion

The regression relation of the Mixture design with the linear model is  $Y_i = \beta_1 \cdot 1 + \beta_2 \cdot 2 + \beta_3 \cdot 3 + \beta_{12} \cdot 1 \cdot 2 + \beta_{13} \cdot 1 \cdot 3 + \beta_{23} \cdot 2 \cdot 3$ . The coefficients of regression equation used to describe the effect of starch on texture, texture, and texture of Thai desserts. Contour plot shows the influence of each starch on texture characteristics in the following areas.



## Conclusion

- Rice flour has no effect on viscosity. It affects the texture of the gel.
- The rice flour gave the hard gel and the opaque color with the highest value of setback from trough.
- Tapioca and arrowroot flour gave the appearance of a soft and clear gel.
- Arrowroot flour provides gel that is stronger than tapioca flour but the gel is softer than the rice flour gel.
- This shows that the three types of starch will give different gel. Replacing the other starch in the product may cause the appearance of the product to be different.