

# Cassava and yam starches used as thickener in yoghurt



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## ABSTRACT

Chemically modified starches are usually employed as thickeners to ensure a desired effect in different food products. In order to offer fully natural products there is a demand for non modified starches which provide desired textural attributes over a larger temperature range. Yam starches have been shown to have promising functional properties as thickeners but have not been as yet fully exploited commercially. This investigation focused on the use of starch isolated from different yam and cassava cultivars as thickeners in yoghurt. Three yoghurt samples at 1 %, 2 % and 3 % of starch were prepared. And then the samples were analysed for a preference test. Another sensory evaluation was carried out with a trained panel of 18 panelists on yoghurt attributes such as: colour, consistency, texture and smoothness. Finally the level of spontaneous syneresis in undisturbed yoghurt was determined. According to their preference 86 % of the panelists selected the very thick yogurt sample as their first choice, 53 % of the panelists selected the least thick yogurt sample as their 2nd choice and 64 % made the less thick yogurt as their 3rd choice. Spontaneous syneresis of yogurt after 7 days at 4°C were 0 % for the both 1 % of starch, 1.05± 0.86 for 2 % of cassava starch, 8.66 ± 0.62 for 2 % of yam starch, 6.09 ± 3.42 for 3 % of yam starch. Due to the high structural strength of the swollen granules, natural yam and cassava starches can be used as an alternative to some types of chemically modified starches. Yam and cassava starches therefore have a high potential as thickening agents in foods.

## INTRODUCTION

- Chemically modified starches are usually employed as thickeners to ensure a desired effect in different food products. In order to offer fully natural products there is a demand for non modified starches which provide desired textural attributes over a larger temperature range. Yam starches have been shown to have promising functional properties as thickeners but have not been as yet fully exploited commercially.
- This investigation focused on the use of starch isolated from different yam and cassava cultivars as thickeners in yoghurt.

## MATERIALS AND METHODS

### Raw Materials

Cassava (*Manihot esculenta*) - Yam (*Dioscorea cayennensis-rotundata*)

### Methods

#### • Yoghurt formulation

Gel starch was added directly at portions of milk or concentrate taken in 5 l beakers to have 1, 2 and 3 % of concentration of starch in 3 l of total yoghurt. And kept in a thermostatically controlled water bath at 85 °C for 15 min. The milk with no starch was considered as control (Nayak et al. 2004). For 3 l of the milk mixture, 3 cups of 160 ml commercial yoghurt was used to inoculate and incubate at 44°C. Commercial cassava starch was included in the study for comparison.

#### • pH measurement

The pH of formulated yoghurt was measured at by a pH meter (....) using electrode.

#### • Determination of spontaneous syneresis of undisturbed set yoghurt

The yoghurt were characterized by spontaneous syneresis (Amatayakul et al. 2006)

#### • Sensory analysis

Preference test and quantitative sensory analysis were done with a untrained and trained panelists. For the preference test 2 tests were done:

- a choice of the best concentration according to their preference
- using a 7 point hedonic scale (1=like extremely to 7=dislike extremely).

For the quantitative test 15 trained panelists evaluated the intensity of difference in colour, consistency, texture, smoothness and acceptability after 24 h in the fridge using a 100 mm scale.

Tab. 2: Preference test of yoghurt with 3% starch

	colour	consistency	texture	smoothness	taste
Yam starch	2	3	3	3	3
Cassava starch	2	2	3	2	2
Commercial starch	2	2	2	2	2
Control	2	3	3	3	2

### Preference test

A preference using 7 points hedonics showed that the panellist like very much (2), and Like moderately (3) the formulated yoghurt (tab.2).

Tab. 3: Quantitative test of yoghurt with 3% starch on 100 mm scale

Starch	Colour***	Consistency***	Texture <sup>ns</sup>	Smoothness**	Acceptability <sup>ns</sup>
Yam	46±12 <sup>b</sup>	72±11 <sup>c</sup>	86±9 <sup>a</sup>	85±9 <sup>ab</sup>	82±10 <sup>a</sup>
Cassava	39±6 <sup>a</sup>	65±10 <sup>b</sup>	86±10 <sup>a</sup>	82±19 <sup>a</sup>	85±9 <sup>a</sup>
Commercial	50±13 <sup>b</sup>	52±14 <sup>a</sup>	89±8 <sup>a</sup>	91±7 <sup>b</sup>	79±13 <sup>a</sup>

### Quantitative test

There is a difference for the colour, consistency and smoothness. The yoghurt with commercial starch is very smooth than yoghurt with cassava and yam. But there is no difference for texture (homogeneity) and acceptability (tab.3).

Tab.4: Spontaneous syneresis (%) of yoghurt (10 ± 2 ml) after 7 days in the fridge

	1 week		
	1%starch	2%starch	3%starch
cassava	0.0	1.1 ± 0.9	0.0
yam	0.0	8.7 ± 0.6	6.1 ± 3.4
Commercial	0.0	0.0	0.0

Tab.5: Spontaneous syneresis (%) of yoghurt (160 ml ± 2 ml) with 3 % starch after 7 days in the fridge

	Syneresis (%)
	1 week
yam	2.04
Cassava	0
Commercial	0

### Spontaneous syneresis

Spontaneous syneresis of yoghurt with 1, 2 and 3% of starch is very important for yoghurt with yam starch (tab.4). Degbeu et al.2008 showed high syneresis in gel yam. This syneresis decreased when the volume of yoghurt increased (tab.5).

## RESULTS AND DISCUSSION



Fig.1: Yoghurt added with 3 % of native starch; (1) control, (2) cassava, (3) yam, (4) commercial starches.

### • Percentage of panelists selected the best concentration

**Number 1:** 86 % of the panelists selected the very thick yogurt (3% starch added) sample as their first choice.

**Number 2:** 53 % of the panelists selected the least thick yogurt sample as their 2nd choice

**Number 3:** 64 % selected the less thick yogurt as their 3rd choice. (Fig. 1)

Tab 1: pH of yoghurt after fermentation (pH 1) and after 24 h in the fridge (pH 2).

Yoghurt with	pH 1	pH 2
Yam starch	4.27	4.02
Cassava starch	4.04	3.81
Commercial starch	4.51	4.28

## CONCLUSION

Native yam and cassava starches can be an alternative to some types of chemically modified starches. .

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