

EFFECT OF MIXING ON THE PHYSICAL PROPERTIES OF GROUNDNUT YOGURT

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ABSTRACT

Drinkable yogurt is the world's fastest growing food and beverages product. Groundnut yogurt can be used for human consumption after partial hydrolysis of component protein by fermentation using certain moulds such product are rationally digestible and nutritious. This paper presents the production of yogurt and effects of mixing and temperature on its rheological properties. Milk yogurt was produced as a control for groundnut yogurt, for Milk yogurt as the speed increased from 10 to 40 rev./min, viscosity increased from 500 centipoise to 1000 centipoise. But as the speed increased from 50-100 rev./min the viscosity start to decrease from 800 to 400 centipoise. Also, as the temperature was increased from 28 to 108 °C, viscosity increased from 500 to 740 centipoise. But as the temperature increased from 128 to 208 °C, the viscosity decreased from 620 to 80 centipoise. While for groundnut yogurt, as the speed increased from 10 to 60 rev./min, viscosity increased from 200 to 560 centipoise. And as the speed increased from 70 to 100 rev./min viscosity decreased to 150 centipoise and was constant through out. When the temperature was increased from 30 to 70 °C the viscosity increased from 200 to 290 centipoise, while as the temperature increased from 78 to 110 °C, the viscosity decreased from 290 to 160 centipoise. The sensory evaluation showed that 90.8% of panelist like the groundnut yogurt, hence, it can be recommended as a source of protein for rural areas.

Keywords: Viscosity, yogurt, Rheological, Centipoise, Nutritious Revolution per minute (rev./min)

INTRODUCTION

Yogurt is known by many names in different countries around the world such as yogurts, yoghurt or yaourt. Yoghurt is the most international variant (www.yogurtprocessing.com). Groundnut milk is also used for yoghurt processing in some countries like India; Sudan. Sudan called groundnut milk as mishi while India called it miltone. Precisely, in India Miltone is a commercial reality. Miltone consists of groundnut milk extended with buffalo milk (Gyan 2000). Although milk of various animals have been used for yoghurt processing in various part of the world. Most of the industrialized yoghurt production used cow's milk whole milk, partially skimmed milk, skimmed or cream may be used. In order to ensure the development of the groundnut yoghurt culture, the following criteria for raw ground nut milk must be met. Low bacterial count, free from antibiotics sanitizing chemical mastitis milk, colostrums, rancid milk and No contamination by bacteriophages (www.yoghurtprocessing.com). There is growing demand for protein throughout the developing world. The major proteins are arachin and conarachin. Groundnut protein undergo changes due to heating or roasting of the seed (Jambunathan, 1991). The content of amino acid in groundnut seed varies according to type of groundnut, cultivars. Location, year and length of maturation period of seed, with advancing the maturity of groundnut seed, amount of free amino acid decreased. While protein content increases conarachin protein that are high in essential amino acid decreased. While protein content increases conarachin protein that are high in essential amino acid were observed to be deposited during early stage of maturity while the arachin protein that are low in essential amino acids deposited during the later stage of maturation (Basha et al, 1980). Groundnut contains much more potassium than sodium and is a good source for calcium, potassium, phosphorus and Magnesium, the forms of vitamin B exist in groundnut such as thiamine, thiamine-mono phosphate and thiamine pyrophosphate. Groundnuts are rich sources of arginine (about 3.4 percent) which helps in wound healing and immunity. (Burn and Haffimen, 1975). The processing of drinkable yoghurt i.e. the removal of free fatty acid (EFA), Colour, and smell or odour, is referred to as refining. It can be mainly classified into three different processes. Degumming, Bleaching and Deodorizing. Other processes appear before, after or some in between these three operations. Some times particles or impurities are found in dissolved form in the milk which increased the turbidity of yoghurts. Such impurities cannot be separated by filtration. Degumming is the treatment of raw milk with water, dilute acids such as phosphoric, citric or malic to remove phosphates, and other impurities. However, this process is very rare as drinking yoghurt are also refined without degumming in USA. Some colour in the drinking yoghurt are harmful to the human health. Hence, bleaching is needed, the main purpose of bleaching is to

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remove a major part of the colouring pigment by adsorption in bleaching earth. While the purpose of deodorizing is to remove odours. (www.foodsci.iwguclph.ca/deingedu/yoghurt.htmw and www.yoghurtprocessing.com)

MATERIALS AND METHODS

The raw groundnut and cow milk (cowbell milk) were bought from Bida market sugar/ preservative flavours and starter culture bought from Dara yoghurt store in Bida. Industrial grade NaHCO_3 was gotten from chemical baking store Bida.

GROUNDNUT MILK PRODUCTION

Groundnut milk was prepared by soaking kernels in percent sodium bicarbonate (NaHCO_3) solution for 16 to 18 hours, the water was drained and the kernels were grinded in aqueous form the wet mass was stirred for 4 to 5 hours and was filtered through cheese cloth to remove the product.

GROUNDNUT YOGHURT PRODUCTION

The groundnut milk was Boiled for 3 minutes and cooks to 45°C and inoculate with yoghurt culture (1:1) mixture of lactobacillus bulgaricus and streptococcus thermophilus grown in whole milk 6 hours at 5% level. incubate at 45°C for 16 hours. After this time elapse add spices and mix. Then Refrigerate mix for 24 hours. Drain through 4 layer of cheese cloth and add salt at 1% level..

MILK YOGHURT PRODUCTION

400g of sampled milk was dissolved in 100ml of luke warm potable water and 70g of sugar was added to form milk broth and stirred gently. The milk broth was pasteurized for 30 minute at the temperature of 85°C and allowed to cool to a temperature of 35°C . Inoculation was done with yoghurt culture and allowed the incubation for 6-8 hours without disturb f and fast cool for about 10-20 minutes and add flavours and stir gently.

DETERMINATION OF EFFECT OF MIXING ON VISCOSITY

one litre of ground yoghurt sample was pleased into the Liquid-Liquid phase mixer and the speed was varied from 10-100 rev. per minute for 10 minutes each and at each speed of the mixer. Sample were taken to viscometer and the viscosity of the sample was read on the scale. The same procedure was repeated for the yoghurt produced from the ground nut milk. Lastly, the sensory evaluation was carried out on the ground yoghurt and cow milk yoghurt for its taste, colour, texture and its acceptability.

RESULT

Table 1 .Effect of mixer's speed and temperature on milk yoghurt.

Volume Cm^3	Time of mixing min	Speed rev/min	Viscosity at diff.speed centipoises	Temp. $^\circ\text{C}$	Viscosity at diff.Temp centipoises
50	10	0	500	28	500
50	20	10	500	28	500
50	30	20	520	48	522
50	40	30	700	68	670
50	50	40	1000	88	710
50	60	50	800	108	740
50	70	60	400	128	620
50	80	70	250	148	400
50	90	80	210	168	220
50	100	90	170	188	190
50	110	100	40	208	80

Table 2 :Effect of mixer's speed and temperature on groundnut yoghurt.

Volume Cm ³	Time of mixing min	Speed rev/min	Viscosity at diff.speed centipoises	Temp. °C	Viscosity at diff.Temp centipoises
			260	30	2 00
50	10	0	200	38	210
50	20	10	210	46	270
50	30	20	280	54	300
50	40	30	400	62	310
50	50	40	420	70	290
50	60	50	560	78	270
50	70	60	350	86	240
50	80	70	150	94	210
50	90	80	150	102	180
50	100	90	150	110	160
50	110	100	150		

Table 3: Sensory evaluation of milk yogurt

	TASTE	COLOUR	TEXTURE	ACCEPTANCE	AROMA
LIKE	16	20	16	16	20
DISLIKE	4	0	4	4	0

Table 4: Sensory Evaluation of groundnut yoghurt

	TASTE	COLOUR	TEXTURE	ACCEPTANCE	AROMA
LIKE	18	17	12	19	20
DISLIKE	2	3	8	1	0

DESCUSSION OF RESULT

It was observed at speed 10 rev/ min no significant mixing of the yoghurt, as soon as the speed reached 20 rev/min there was significant viscosity value for milk yoghurt which was 500-520centipoise while that of groundnut was 200-210 centipoises. It was observed for milk yoghurt that for mixer's speed between 20-50 revolution per minutes there was an increase in viscosity from 520-800 centipoises, and for speed between 60- 100revolution per minutes , the viscosity decreases from 400 -40 centipoises . While for ground nut yoghurt viscosity increased from 200-560 centipoises for a speed range of 20-70 rev/min, while viscosity start to decrease from 350-150 for mixer's speed of 70-100 rev/min. There was also significant increase in viscosity from 500-710 centipoises for temperature range between 28 -108 °C ,while for temperature between 128°C -208 °C there was a decrease in viscosity from 620-80centipoise for milk yoghurt. Similarly, there was increase in viscosity for ground nut yoghurt when the temperature was increased from 30- 62°C and the viscosity was 200-310 centipoises while viscosity decreased from 290-160 centipoises for temperature between 70°C-110°C .The sensory evaluation for groundnut yogurt was 90.8%.while that of milk yoghurt was 86.4%

CONCLUSION

It was observed that for both groundnut and milk yoghurt, Mixing and temperature have influence on the viscosity of yoghurt. Hence, during processing ground nut yoghurt should be processed using mixer's speed between 40-60 rev/min and temperature between 46 -54 °C while for milk yoghurt ,mixers speed between 20-50 rev/min can used and temperature between 28 -48°C.Also during transportation the product should not be expose to excessive heat of the engine .

RECOMMENDATION

Spray-dried groundnut milk should be produced and use for production of yoghurt like the dried cow/ Soya milk.

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