

## Sensory Evaluation of Yoghurt Produced using Oil and Water Milk-based Flavours

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**ABSTRACT:** This research was carried out to sensory evaluate the preference of yoghurt produced with differently based (oil and water) milk flavours and to investigate its effect on the attributes of yoghurt which include (texture, appearance, aroma and taste) to provide awareness of flavour impact on the sensory attributes of yoghurt which would aid to improve the quality yoghurt as regards to flavours thereby stimulating consistent consumption hence growth improvement. Results gotten after analysis showed that both produced milk yoghurt flavours had no significant difference ( $P < 0.05$ ). They were statistically ascertained to be of the same preference and as well they did not differ across the various physical attributes. It could be recommended that the impact of different oil and water-based flavouring on the sensory evaluation of yoghurt should be explored by conducting a series of sensory evaluations to determine if certain flavourings are more appealing than others, and if there are any noticeable differences in taste or texture between the yoghurt produced using both based flavours. Also, sensory evaluation of yoghurt produced from different milk types (powder milk, skim milk and filled milk) and see if there is any noticeable difference.

**Keywords:** Fermented milk, production, sensory attributes consumers

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### INTRODUCTION

Dairy products or milk products, are food products made from (or containing) milk. These products include: yoghurt, cheese, ice cream, butter etc. The most common dairy product is yoghurt. The popularity of yoghurt stems from its number of characteristics such as its pleasant aromatic flavour, thick creamy consistency and its reputation as a food associated with good health (Kleyn *et al.*, 1979; Domagla, 2005). Yoghurt is a fermented milk product that evolved empirically some centuries ago by allowing naturally contaminated milk to sour at a warm temperature probably in the temperature range of 40-50°C (Ihekoronye and Ngoddy, 1985). They are produced from whole or partially skimmed cows or buffalo's milk. It is a popular fermented milk product that has a special importance on human health because of its perceived nutritional benefits. The probiotic elements in

yoghurt are the lactic acid-producing bacteria (LAB), which include *Lactobacillus* genera, *Lactobacillus bulgaricus* and *Streptococcus thermophilus* have severally been demonstrated as the cause of their health benefits and the reasons for their description as functional foods (Adolfsson *et al.*, 2004). Generally, yoghurt is manufactured from preheated milk. Fat and dry matter content vary with respect to region and legislation either in the plain form or with added materials. Yoghurt production and consumption are rapidly increasing. Therefore, it is important that yoghurt quality (taste, aroma or sensation) should be considered in order to facilitate consumption. There have been a lot of improvements in the industry where starter culture is used to ferment the milk for a specific period and desired flavours are achieved. That aside, desired flavours are

also added to achieve specific taste and aroma (Ihekoronye and Ngoddy, 1985).

Flavours are substances added to blend the taste and smell sensation evoked by the yoghurt in the mouth and nose. Flavours are added to achieve stimulation for consistent consumption. Yoghurt is an excellent source of protein. Consumption of 200 to 250ml of yoghurt meets the minimum daily requirement of an adult. This protein is highly digestible as most of the protein is in digested form. Consumption of yoghurt promotes growth as a result of improved lactose digestion, and greater mineral absorption besides providing thiamine, riboflavin, niacin and folic acid (Deeth and Temime, 1981).

The sensory evaluation of yoghurt is a critical aspect of its quality control, and the use of oil and water based flavours in yoghurt production is gaining popularity. However, there is a lack of research on the impact of these flavours on the sensory properties of yoghurt, therefore, this study aims to investigate the effect of oil and water based flavours on the sensory attributes of yoghurt, including appearance, texture, aroma, and taste through a comprehensive sensory evaluation. The result of this study will provide valuable insight into the impact of flavouring on the sensory properties of yoghurt, which can be used to improve the quality of yoghurt production and enhance consumer satisfaction.

Milk composition and quality are important attributes that determine the productivity and nutritive value of yoghurt that influence the acceptability and consumption of yoghurt products. Therefore, the need to improve the composition and quality of yoghurt flavour to enhance consistent consumption as this will aid in essential body development. Thus, the aim of this study is to evaluate yoghurt produced using oil and water-based milk flavour.

## MATERIALS AND METHODS

### Study area

This research was carried out in the physical laboratory, Faculty of Agriculture, Usmanu Danfodiyo University Sokoto. Sokoto is located in the Sudano-sahelian zone in the extreme north-western part of Nigeria. It lies between latitude 12° and 13°05'N and between longitudes 4°8' and 6°4'E the northern part of Nigeria and at an altitude 350m above sea level (Mamman *et al.*, 2000). The states fall within the Sudan savannah vegetation zone, with alternating wet seasons. The hot dry spell season extends from March to May and sometimes to June in the extreme northern part. The wet season on the other hand begins in May and lasts up to September or October. During harmattan, a dry, cold, and fairly dusty wind is experienced in the state between November and February (Mamman *et al.*, 2000).

### Sampling and procedure

Milk samples used for the study were collected from the cows in the early hours of the morning. The milk was collected in a plastic container and transported under recommended conditions to the laboratory where it was immediately subjected to the experimental procedure.

### Experimental ingredients

The experimental ingredients used in the production of the yoghurt include;

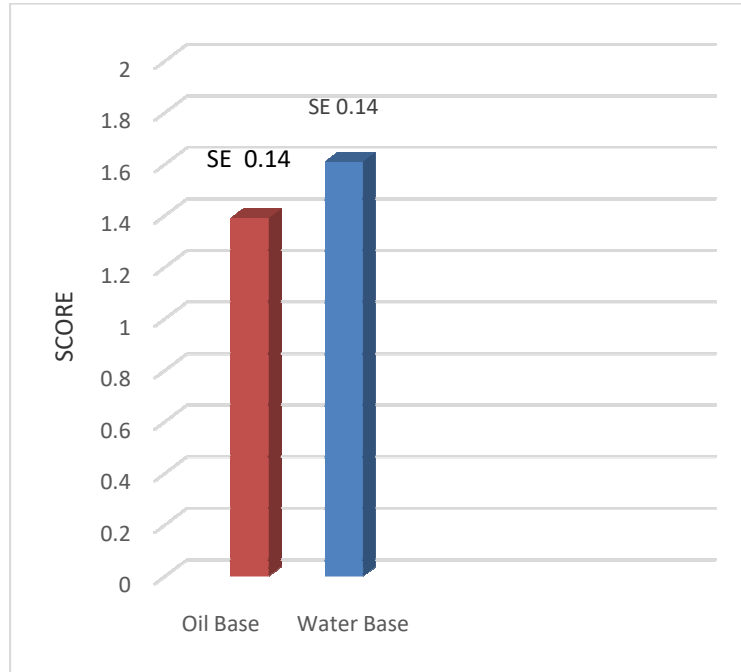
Milk, Sugar, Stabilizer (corn flour), Starter culture (*Lactobacillus bulgaris* and *Streptococcus thermophilus*), Flavour, Color, Preservative (sodium benzoate).

### Experimental procedure

The milk was weighed using a measuring cylinder to obtain nine (9) liters of the milk. The milk was clarified using a clarifier to remove all the foreign material from the fresh milk. The measured fresh milk was then poured into a pot and placed on a burning oven and heated to 138°C-150°C for 2 seconds to pasteurize the milk. The pasteurized milk was then poured into a bucket and allowed to freely cool to 40-45°C. Four (4) liters of the cooled milk were then measured into two separate buckets. A teaspoon of starter culture was added to both four (4) liters of milk and stirred. The milk was then covered and placed on an improvised incubator for eight (8) hours. A commercial corn starch of about thirty (30g) was mixed with hot water to serve as an extender, the extender was then poured into the yoghurt and stirred with a blender at the lowest speed. Three hundred (300g) of sugar was measured and poured into each container of yoghurt, and 0.02g of sodium benzoate (E2111) was added to the yoghurt as a preservative and stirred continuously. Four (4g) of powdered flavour was measured and diluted into 4ml of water and mixed. Two (2g) of the water and oil-based flavours were measured and poured into each container of the yoghurt and stirred. The yoghurt was then poured into 33ml containers and tightly sealed for subsequent storage. The packaged yoghurt was all placed into the refrigerator to prevent further fermentation of the yoghurt.

### Data collection

A checklist was used to collect data from respondents. Fifteen (15) semi-trained panelists comprised of non-smokers and non-alcoholics were presented with five gram (5g) of blind-coded samples of the yoghurt. The panelists were given the samples collectively to taste



**Figure1:** Consumer preference for yoghurt produced using oil and water milk based flavours.

**Table 1:** Consumer preference based on physical attributes of the yoghurt produced using oil and water milk-based flavours.

Treatments	Aroma	Color	Texture	Flavours	After taste
Oil base	3.99	3.36	3.36	4.89	3.69
Water base	7.47	5.82	6.22	6.71	7.36
SE	0.73	0.84	0.86	0.85	0.69

and score the samples based on the evaluation techniques.

### Data analysis

All data generated from the experiment are subjected to T-test analysis using IBM SPSS (2020) Statistical software (Version 27.0) and the means were considered significant at  $P < 0.05$ .

## RESULTS AND DISCUSSION

### Most preferred amongst the two samples

The results in (Figure 1) shows the consumers' preference for yoghurt produced using oil and water milk-based flavours. The result indicates that there are no significant differences ( $P > 0.05$ ) between the two flavours (oil and water based).

The result in (Figure 1) shows that the two produced yoghurt did not differ significantly ( $P > 0.05$ ). This may be true because in a situation whereby flavours are having

the same constituents, they are bound to the same preference and as such research shows that the two flavours are produced using the same substances which include lactones, acids, aldehydes, alcohols, ketones, esters, sulphur compounds, furan and Nitrogen compounds. It is in accordance with the findings of Muzart (2010) who states that constituent which includes lactones, acids, aldehydes, alcohols, ketones, esters, sulphur compounds, furan and nitrogen compounds, a harmonious flavour with typical characteristics of milk was obtained. And hence have attributed to a lack of change in the flavour of the yoghurt produced in the present study.

### Consumer preference of several attributes of the yoghurt

Table 1 shows that there is no significant difference at ( $P > 0.05$ ) across the various physical attributes of the yoghurt produced using the two flavours. The inability of the panel to differentiate the yoghurt sensation may be attributed to the ingredient used in producing the yoghurt.

Another factor is the two test ingredients added are from the same constituent. This might have been attributed to indifference and this is contrary to the findings of Alhaj and Kanekanian (2014) who reported that the aroma, body and taste of yoghurt and other cultured dairy product can vary depending on the type of culture and milk, amount of milk fat and nonfat milk solids, fermentation process and temperature used.

## Conclusion

The study findings indicate that there is no significant difference in preference or physical attributes between the yoghurt produced using water-based and oil-based flavours. This suggests that both variations are equally acceptable to consumers and maintain consistent quality in terms of taste and texture.

## Recommendation

Further exploration of the impact of various flavorings, beyond oil and water-based options, is recommended to determine the potential appeal of different flavorings and any noticeable differences in the physical characteristics of the resulting yogurt. Additionally, it would be beneficial to produce yogurt using water-based and oil-based flavors with different forms or types of milk (such as powdered milk, fresh milk, and filled milk) in order to compare any potential differences from the current study's findings.

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