



# Quality Evaluation of Set Yoghurt Supplemented with Turmeric Powder (*curcoma longa.L*) during Storage Period



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## Introduction

- Functional foods are a modified food claims to improve health or well-being by providing benefit beyond that of the traditional nutrients it contains.
- Yoghurt has been ranked as the most widely available fermented milk product in the world today
- Nowadays yoghurt sold with different flavors e.g. with ginger and herbs which are added to the fresh milk before fermentation or served with sugar syrup and various fruits, vegetables and spices e.g. Turmeric.
- Tumeric is a spice that comes from the root *Curcuma longa*, a member of the ginger family, Zingiberaceae.
- Curcumin is the main active ingredient in turmeric responsible for turmeric's numerous activities. Known by its anti-oxidative, anti-microbial and anti-inflammatory properties and as a cancer and chemo preventive agent.
- The rhizome of turmeric has a rich history in India as spice, food preservative, and coloring agent and has been used for centuries in the Ayurvedic system of medicine.
- Turmeric contains very good amounts of minerals and vitamins.

## Objectives

To assess the effect of supplementing set yoghurt made from cow's milk with different levels of turmeric on some physico-chemical properties, microbiological quality and organoleptic characteristics during the storage period.



Figure 1: (A) The root of turmeric, (B) powder of curcumin.

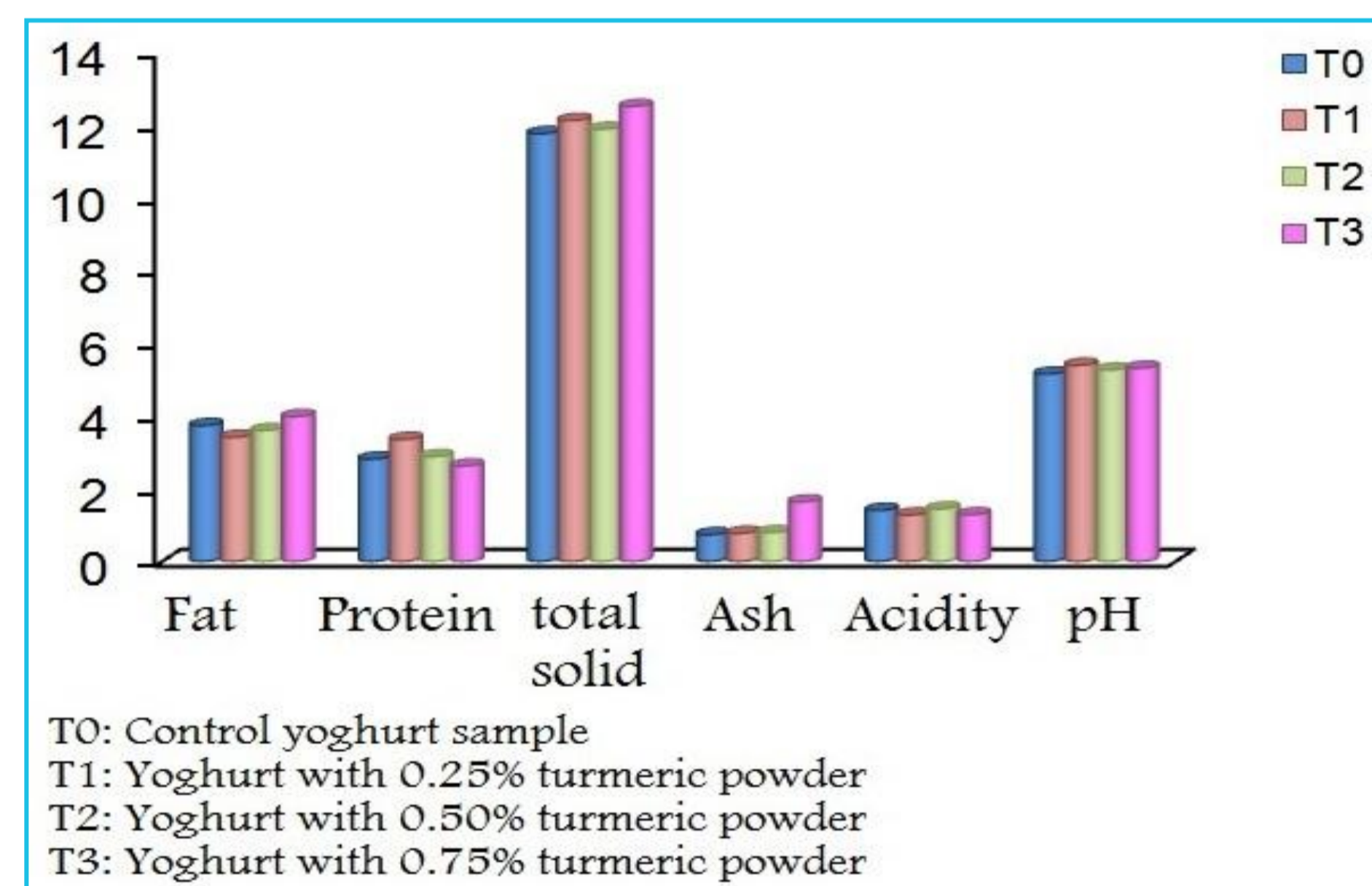


Figure 2: The effect of Turmeric powder on some physico-chemical properties of set yoghurt

Table (1): The effects of storage period on some physico-chemical properties of turmeric yoghurt.

Parameters	Storage period (days)				SE	SL
	1	5	8	12		
Fat (%)	3.63 <sup>a</sup>	4.10 <sup>a</sup>	3.86 <sup>a</sup>	3.25 <sup>b</sup>	0.07	*
Protein (%)	3.63 <sup>a</sup>	3.04 <sup>b</sup>	2.52 <sup>c</sup>	2.47 <sup>c</sup>	0.02	***
Total solids (%)	13.76 <sup>a</sup>	11.89 <sup>b</sup>	10.74 <sup>c</sup>	11.89 <sup>b</sup>	0.20	**
Ash (%)	1.65 <sup>a</sup>	0.75 <sup>b</sup>	0.76 <sup>b</sup>	0.76 <sup>b</sup>	0.01	**
Acidity (%)	1.14 <sup>c</sup>	1.35 <sup>b</sup>	1.42 <sup>a</sup>	1.48 <sup>a</sup>	0.002	***
pH	5.08 <sup>b</sup>	5.85 <sup>a</sup>	5.80 <sup>a</sup>	4.37 <sup>c</sup>	0.004	***

Means in each row bearing similar superscripts are not significantly different ( $P > 0.05$ ), SE = Standard error of means, SL = Significance level, \*\*\* =  $P < 0.001$ , \*\* =  $P < 0.01$ , \* =  $P < 0.05$

Table (2). The effects of addition of turmeric Powder on microbiological quality ( $\log_{10}$  cfu/ml) properties of set yoghurt

Parameters	Concentration of turmeric powder (%)				SE	SL
	T0	T1	T2	T3		
TVC	7.91 <sup>a</sup>	6.47 <sup>b</sup>	5.74 <sup>c</sup>	5.42 <sup>d</sup>	0.003	***
LAB	6.97 <sup>a</sup>	6.09 <sup>b</sup>	5.66 <sup>c</sup>	5.11 <sup>d</sup>	0.002	***
Coliform	1.44 <sup>a</sup>	1.37 <sup>a</sup>	0.20 <sup>b</sup>	0.00 <sup>b</sup>	0.037	***
YM	0.95 <sup>ab</sup>	0.88 <sup>ab</sup>	1.39 <sup>a</sup>	0.66 <sup>b</sup>	0.064	***

TVC= Total viable Bacteria Count, LAB= Lactobacilli Bacteria Count, YM= Yeast and Moulds, Means in each row bearing similar superscripts are not significantly different ( $P > 0.05$ ), SE = Standard error of means, SL = Significance level, \*\*\* =  $P < 0.001$

## Materials and Methods

### Material

- Raw cow's milk was obtained from the University of Khartoum dairy farm.
- The starter culture was purchased from Christina Hansens Company (Denmark).
- Turmeric powder and plastic cups were purchased from local market.

### Experimental yoghurts

It made at the Dairy Processing Laboratory at the Faculty of Animal Production, University of Khartoum (Shambat).

### Yoghurt production:

- The milk was stirred, and heated for 90°C for 5 minutes followed by cooling to 42°C.
- It inoculated with 3% of starter culture.
- Turmeric powder was added at the rate of 0.25% (T1), 0.50% (T2), and 0.75% (T3) in addition to plain yoghurt without turmeric as a control (T0).
- The inoculated milk was incubated at 45°C until a uniform coagulant was obtained in about 4 hours and the sample was storage at 5 °C.
- Chemical analysis and microbiological tests, sensory characteristics were carried out at 1, 5, 8 and 12 day intervals.

### Statistical Analysis:

- The data obtained were subjected to Analysis of Variance (ANOVA) for factorial design using computer software Statistix version.8.

## Results

- The effect of concentration of turmeric powder significantly affected the physico- chemical properties of yoghurt.
- The highest fat (3.98%), Ts (12.51%), and ash (1.36%) levels being in yoghurt made with 0.75% turmeric, while protein (3.35%) and pH (5.39) was high in yoghurt made with 0.25% turmeric and acidity was high (1.44) in concentration yoghurt made with 0.50% turmeric (Figure 3).
- The storage period significantly affected the physico-chemical properties of turmeric yoghurt (Table 1).
- Turmeric powder concentration are significantly ( $P < 0.001$ ) affected all microorganisms under test.

- Microorganism counted was higher on control yoghurt) compared with yoghurt supplemented with turmeric powder (Table 2).

- T3 yoghurt samples secured the best microbial profile with resultant lowest TVC, LAB and complete absence of coliform bacteria.

- Turmeric powder concentration are significantly ( $P < 0.001$ ) influenced the sensory characteristics of the set yoghurt.

The highest score of color, texture, taste and overall acceptability was in T1 yoghurt.

## Conclusion

The effect of turmeric powder was significant on the physico-chemical properties of the set yoghurt. Furthermore, the addition of turmeric powder significantly affected the microbiological quality and organoleptic characteristics of the set yoghurt.