

## Studies on Physicochemical Quality of Milk Cake from Admixture of Buffalo Milk and Chickpea (*Cicer aritenum* Linnaeus) Solids.

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### ABSTRACT

**Bengal Gram or Chickpea (*Cicer aritenum*, Linnaeus) is very rich in nutrients, especially in protein content (21%). It is easily available throughout Indian subcontinent. It has therapeutic value and held high by Ayurvedic sciences. Milk cake is a delicious, mouthwatering dessert, very popular sweet in northern and central part of India. This is an unique Cake made with just a few ingredients. Milk cake is a common sweetmeat which can be enriched by addition of chickpea solids. The basic aim of study was to find out the physicochemical parameters and yield of milk cake blended with buffalo milk and chickpea solids. The data collected on different aspects were tabulated and analyzed statistically using the methods of analysis of variance and critical difference. According to the analysis, treatment T<sub>4</sub> with 8% was found to be the best among the three chick pea solids milk cake. Thus, as per acceptability of the product judged by physicochemical evaluation and therapeutic value, the treatment can be rated as T<sub>4</sub>>T<sub>3</sub>>T<sub>2</sub>>T<sub>1</sub>>T<sub>0</sub>. The highest mean score for yield percentage of chickpea milk cake (27.45) was obtained from treatment T<sub>4</sub> followed by T<sub>3</sub> (26.87), T<sub>2</sub> (26.52) and T<sub>1</sub> (26.07). The minimum score (26.04) was obtained by T<sub>0</sub>.**

**Key words** Chickpea , Milk cake, Buffalo milk, Physicochemical, yield.

In India, there exist huge varieties of indigenous milk products, specific to the different regions, across the country. Most indigenous milk products are produced and sold loose by local Halwais/ Mithiwalas (David, 2009). Several government and private organizations have been conducting research on the mechanized and hygienic production as well as distribution of the indigenous milk products. Out of indigenous milk products Khoa serves as an important base for delicious sweet meats like Burfi, Peda, Gulabjamun, Milk cake etc. Milk cake is a delicious, mouthwatering dessert. This is a unique Cake made

with just a few ingredients. (Anonymous, 2011). The milk cake is a very popular sweet in northern and central part of India. It is prepared traditionally by untrained manufacturer (Karwasara *et. al* 2001).

Gram or Chickpea (*Cicer aritenum* Linnaeus), a member of family Fabaceae, is an ancient self-pollinated leguminous crop, diploid annual (2N=16 chromosomes) grown since 7000BC, in different area of the world, but its cultivation is mainly concentrated in semi –arid environments

The medicinal value of the chickpea is worth mentioning here. The leaves and seeds of the chickpea are important due to the presence of glandular secretions are commonly used as medicine. This plant holds a good repute in ‘Ayurvedic’ and ‘Unani’ system of medicine. According to Ayurvedic method of treatment, chickpea leaves are sour, astringent which improve taste and appetite. Moreover, the leaves are used to cure chronic bronchitis and the seeds are considered as antibilious, used as tonic, stimulant and aphrodisiac acid is also supposed to lower the blood cholesterol level (Duke, 1981). Chickpea has also the property to act hypo cholesteremic agent. Germinating chickpea is believed to reduce the blood cholesterol level.

Chickpea is very rich in nutrients, especially in protein content (21%). It is easily available throughout Indian subcontinent. It has therapeutic value and held high by Ayurvedic sciences. Milk cake is a common sweetmeat which can be enriched by addition of chickpea solids.

### MATERIALS AND METHODS

#### Manufacturing of Control and Experimental milk cake:

Milk cake is an indigenous milk product, prepared by two methods from milk or khoa. Milk

**Table 1. Average of different physicochemical parameters of Control and chickpea milk cake**

S.No.	Parameters(%)	Control and chickpea milk cake					F Value	CD
		T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>		
1.	Carbohydrate	51.17	48.68	44.76	41.56	39.06	94.97*	1.528
2.	Protein	11.52	14.33	16.88	18.14	20.15	6732.069*	0.122
3.	Fat	19.17	19.19	19.25	20.86	21.61	270.891*	0.206
4.	Moisture	15.86	15.78	15.76	15.75	15.74	23.764*	0.031
5.	Total solids	84.14	84.22	84.24	84.25	84.26	23.764*	0.031
6.	Ash	2.27	3.14	3.35	3.49	3.45	752.503*	0.054
7.	Acidity#	0.15	0.16	0.17	0.17	0.18	15.02*	0.009
8.	Yield	26.04	26.07	26.52	26.87	27.45	357.556*	0.093

\* Significant at 5 % level

\*\* Non-significant at 5 % level

# As per Lactic Acid.

cake made from milk slightly differs in respect of its manufacturing process to that of milk cake made from khoa. Milk Cake was prepared from Buffalo milk and Chickpea solids as standard process by Karwasara *et. al* (2001).

#### Details of different treatments

Materials	Milk Cake prepared from Buffalo milk and Chickpea solids				
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Chickpea solids	-	2%	4%	6%	8%

#### Statistical analysis

The data obtained on different aspects as per plan were tabulated and statistically analyzed as per Chandel, 1991.

### RESULT AND DISCUSSION

Average of different physicochemical parameters of milk cake blended with buffalo milk and chickpea solids:

Table 1 shows average of different physicochemical parameters of Control and chickpea milk cake.

#### Carbohydrates

The highest mean value for carbohydrates percentage the chickpea milk cake (51.17) was obtained for the T<sub>0</sub> followed by T<sub>1</sub> (48.68), T<sub>2</sub> (44.76) and T<sub>3</sub> (41.56). The minimum score (39.06) was obtained in T<sub>4</sub>. There were significant

differences found among the treatments. F Value was 94.97, indicating significant effect of treatment on Carbohydrates (Fig. 1).

#### Fat percentage

The highest mean score for fat percentage of chickpea milk cake (21.61) was obtained for treatment T<sub>4</sub> followed by T<sub>3</sub> (20.86), T<sub>2</sub> (19.25) and T<sub>1</sub> (19.19). The minimum score (19.17) was obtained in T<sub>0</sub>. There were significant differences found among the treatments. F Value was 270.891, indicating significant effect of treatment on fat percentage (Fig. 1).

#### Protein percentage

The highest mean score for protein percentage of chickpea milk cake (20.15) was obtained for treatment T<sub>4</sub> followed by T<sub>3</sub> (18.14), T<sub>2</sub> (16.88) and T<sub>1</sub> (14.33). The minimum score (11.52) was obtained in T<sub>0</sub> (control). There were significant differences found among the treatments. F Value was 6732.069, indicating significant effect of treatment on protein percentage (Fig. 1).

#### Total Solids percentage

The highest mean score for Total solids percentage of chickpea milk cake (84.26) was obtained from treatment T<sub>4</sub> followed by T<sub>3</sub> (84.25), T<sub>2</sub> (84.24) and T<sub>1</sub> (84.22). The minimum score (84.14) was obtained in T<sub>0</sub> (treatment). There were significant differences found among the treatments. F Value was 23.764, indicating significant effect of treatment on total solids percentage (Fig. 1).

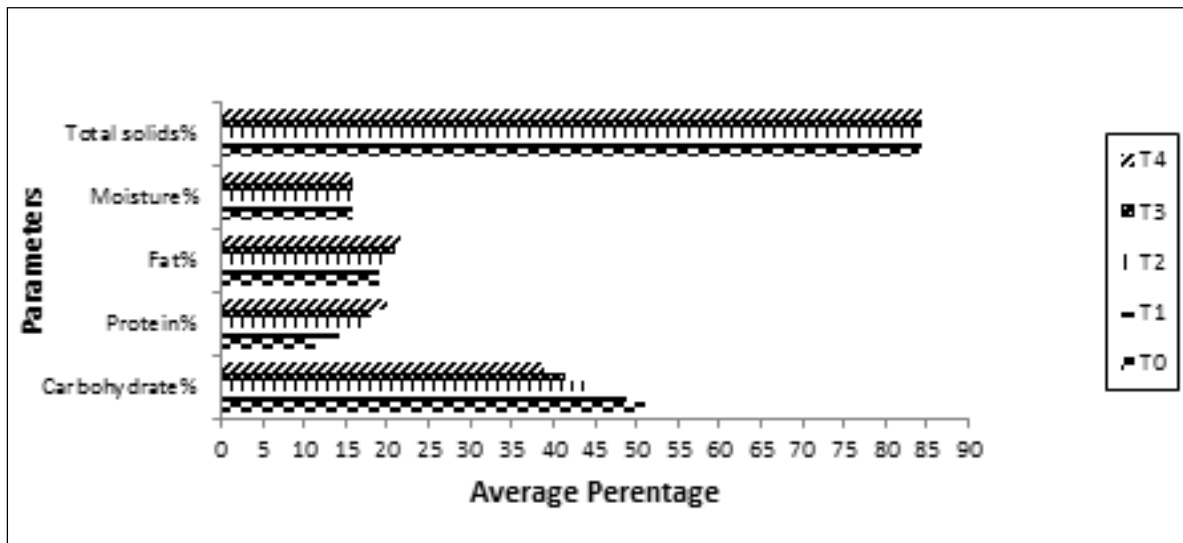


Fig. 1. Average of different physiochemical parameters of Control and chickpea milk cake.

**Moisture percentage:**

The highest mean score for Moisture percentage of chickpea milk cake (15.74) was obtained from treatment T<sub>4</sub> followed by T<sub>3</sub> (15.75), T<sub>2</sub> (15.76) and T<sub>1</sub> (15.78). The minimum score (15.86) was obtained in T<sub>0</sub> (treatment). There were significant differences found among the treatments. F Value was 23.764, indicating significant effect of treatment on moisture percentage (Fig. 1).

**Ash percentage**

The highest mean score for Ash percentage of chickpea milk cake (3.49) was obtained from treatment T<sub>3</sub> followed by T<sub>4</sub> (3.45), T<sub>2</sub> (3.35) and

T<sub>1</sub> (3.14). The minimum score (2.27) was obtained in T<sub>0</sub> (treatment). There were significant differences found among the treatments. F Value was 752.503, indicating significant effect of treatment on ash percentage (Fig. 2).

**Titration Acidity percentage**

The highest mean score for acidity percentage of chickpea milk cake (0.18) was obtained from treatment T<sub>4</sub> followed by T<sub>3</sub> (0.17), T<sub>2</sub> (0.17) and T<sub>1</sub> (0.16). The minimum score (0.15) was obtained in T<sub>0</sub>. There were significant differences found among the treatments. F Value was 15.021 indicating significant effect of treatment on titration acidity percentage (Fig. 2).

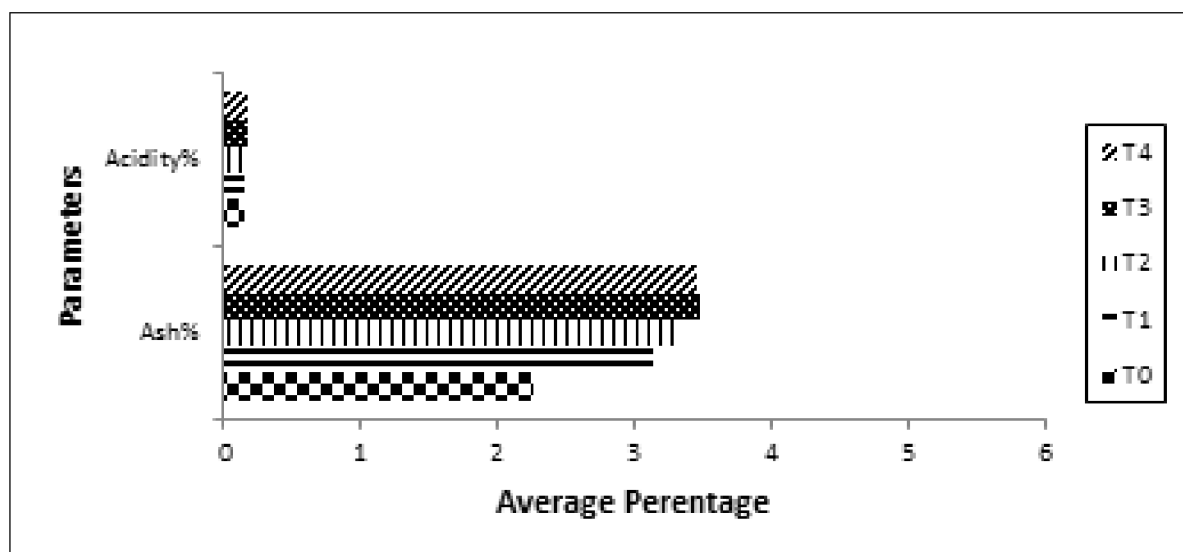


Fig. 2. Average of different physiochemical parameters of Control and chickpea milk cake.

**Table 2. Average of microbial parameters of control and chickpea milk cake**

S.No.	Parameters	Control and chickpea milk cake					F Value	CD
		T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>		
1.	S.P.C.	8.00	8.00	8.00	8.00	7.80	0.046**	-
2.	Yeast & mould	29.20	26.80	24.80	25.00	23.80	1.50**	-

\* Significant at 5 % level

\*\* Non-significant at 5 % level

### Yield

The highest mean score for yield percentage of chickpea milk cake (27.45) was obtained from treatment T<sub>4</sub> followed by T<sub>3</sub> (26.87), T<sub>2</sub> (26.52) and T<sub>1</sub> (26.07). The minimum score (26.04) was obtained in T<sub>0</sub>. F Value was 357.556, indicating significant effect of treatment on titrable acidity percentage (Fig. 2).

### Average of microbial parameters of control and chickpea milk cake

Table-2 shows Average of microbial parameters of control and chickpea milk cake

### Standard plate count

The highest mean score for Standard plate count percentage of chickpea milk cake (8) was obtained from treatment T<sub>0</sub> followed by T<sub>1</sub> (8), T<sub>2</sub> (8) and T<sub>3</sub> (8). The minimum score (7.80) was obtained in T<sub>4</sub>.

### Yeast and mould count

The highest mean score for Yeast and mould count percentage of chickpea milk cake (29.20) was obtained from treatment T<sub>0</sub> followed by T<sub>1</sub> (26.80), T<sub>2</sub> (24.80) and T<sub>3</sub> (25.00). The minimum score (23.80) was obtained in T<sub>4</sub>.

None of the samples of milk cake i.e., control and experimental samples showed the presence of

the coliforms at 0 day. The entire sample, at all the stages, were found gram-negative, which indicates proper hygienic conditions were maintained during the preparation and storage of the product.

Observing the experimental results of the present investigation into considerations, it can be concluded that as per physico chemical analysis, treatment 4 (T<sub>4</sub>) with 4% chick pea soids possess maximum moisture, protein, fat, ash content and yield while the control sample (T<sub>0</sub>) has maximum Carbohydrate content. The microbial count was found to be within the limit. There was significant difference between and within the treatments.

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