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Study of microbiological quality of *Khoa* based *Kalajam*

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ABSTRACT : The present investigation carried out by obtaining *Khoa* based *Kalajam* samples from different markets of Kanpur city and laboratory prepared. It was observed that the maximum standard plate count per gm. was found in the *Khoa* based *Kalajam* samples obtained from Birhana Road market (13.99×10^4) and lowest in the laboratory prepared *Khoa* based *Kalajam* samples (2.0×10^4). While maximum yeasts and moulds count per g of *Khoa* based *Kalajam* samples was found in Govind Nagar market (13.66×10^5) and lowest in the laboratory prepared *Khoa* based *Kalajam* samples (4.0×10^5).

KEY WORDS : Microbiological quality, *Khoa*, *Kalajam*

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INTRODUCTION

Khoa based *Kalajam* is an indigenous sweet milk product of considerable economic and nutritional importance to the people of this county. It is prepared by using techniques that are suitable for small scale operations.

Both pathogenic and non-pathogenic micro-organisms may be found in *Khoa* as well as in *Kalajam*. It serves as suitable medium for the growth and transmission of pathogenic micro organisms, there by it is a potential source of danger to public health, if not properly handled. Bacteria enter in the *Kalajam* from two sources *i.e.* from raw milk and from external contamination during manufacturing handling and storage. Since milk is treated to high temperature during *Khoa* making, most of the bacteria present in raw milk are destroyed except few spore formers or heat resistant. Therefore, chief source of microorganisms, in *Khoa* based *Kalajam* is the post – preparation contamination, which may be manufacturing utensils, sugar, person, storage room and keeping practices.

The microbiological quality of *Kalajam* is of utmost important to prolong the life of *Kalajam* as well as to save the lives of, consumer against pathogens. The micro-biological quality of all Indian milk products are deplorably poor and the same situation exists with *Khoa* and *Kalajam*.

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MATERIALS AND METHODS

Standard plat count (SPC) :

The total viable count was done on plate count agar medium. Appropriate dilution of *Kalajam* suspension was plated in duplicate plates using the above medium and the plates were incubated at 37^0 C for 48 hours and colonies were counted to the standard procedure (American Public Health Association, 1960).

Yeasts and moulds count :

Yeasts and moulds count was done by plating dilution of *Khoa* based *Kalajam* in sterile petriplates using Potato dextrose agar medium. The plates were incubated at $22^0 \pm 1^0$C for 3-5 days and yeasts and moulds colonies were counted with the help of colony counter.

RESULTS AND DISCUSSION

The results of the present investigation as well as relevant discussion have been presented in the following sub heads:

Standard plate count :

As is evident from Table 1 a, the overall average of standard plate count / g of *Khoa* based *Kalajam* samples collected from different markets of Kanpur city were recorded as 9.27×10^4/g with the range of 6.66×10^4/g. to 11.88×10^4/g.

Table 1(a) : Standard plate count /g of *Khao* based *Kalajam* samples collected from different markets of Kanpur city prepared in the laboratory

Sr. No.	Markets	No. of samples	SPC/g (x 10^4)			Avg. log value
			Min.	Max.	Avg.	
1.	Nawabganj	9	6.66	8.00	7.33	4.8651
2.	Rawatpur	9	6.88	11.88	9.38	4.9722
3.	Kalyanpur	9	14.33	8.33	11.38	5.0542
4.	Saket Nagar	9	11.33	9.66	10.49	5.0207
5.	Birhana Road	9	16.66	11.33	13.99	5.1458
6.	Govind Nagar	9	13.00	11.33	12.16	5.0849
7.	Overall average of Kalajam samples	54	6.66	11.88	9.27	4.9670
8.	Lab. prepared (Control)	3	1.00	3.00	2.00	4.3010

Table 1 (b) : Analysis of variance of SPC/g. of *Khoa* based *Kalajam* samples collected from different markets of Kanpur city and prepared in laboratory

Sr. No.	Source of variation	D.f.	S.S.	F. Cal. value	F Table		C.D.
					5%	1%	
1.	Control/treatment	1	227.37	227.37	64.16**	7.36	2.2605
2.	Between shops with in market (s)	2	56.33	28.16	7.95**	5.222	1.2703
3.	Between market (m)	5	231.72	48.34	13.08**	3.548	1.7965
4.	S x M	10	104.11	10.41	2.94	2.86	3.1116
5.	Error	38	134.11	3.54			
	Total	56	753.64				

	S.E. (M)	S.E. (D)	C.D.
M	0.627	0.887	1.796
S	0.443	0.627	1.270
SxM	1.086	1.536	3.110

The highest standard plate count / g was recorded in *Khoa* based *Kalajam* samples obtained from Birhana Road market having average 13.99 x 10^4/g with range of 16.66x10^4/g. to 11.33x10^4/g.

The lowest SPC/g was recroded in *Khoa* based *Kalajam* samples obtained from Nawabganj market having average range of 7.33 x 10^4/g with the range of 6.66 x 10^4/g to 8.00 x 10^4/g.

Standard plate count / g was found in the laboratory prepared *Khoa* based *Kalajam* samples with average of 2.0 x 10^4/g with the range of 1.00 x 10^4/g to 3.00 x 10^4/g.

The statistical analysis of SPC showed that the variation between control vs. treatment was found highly significant at 1 per cent level of significance. The variation between market was also found highly significant at 1 per cent level of significance as well as the variation between shops with in the markets was also found highly significant at 1 per cent level of significance (Table 1 b).

Table 2 (a) : Showing yeasts and moulds count/g of *Khoa* based *Kalajam* samples collected from different markets of Kanpur city and prepared in the laboratory

Sr. No.	Markets	No. of samples	Yeasts and moulds count/g (x10^5)			Average log value
			Min.	Max.	Ave.	
1.	Nawabganj	9	8.00	15.33	11.66	6.0666
2.	Rawatpur	9	8.33	17.00	12.66	6.1024
3.	Kalyanpur	9	10.33	13.00	11.66	6.0666
4.	Saket Nagar	9	10.33	13.33	11.83	6.0729
5.	Birhana Road	9	6.66	20.00	13.33	6.1248
6.	Govind Nagar	9	11.33	16.00	13.66	6.1354
7.	Overall average of market samples	54	6.66	20.00	13.33	6.1248
8.	Lab prepared (Control)	3	3.00	5.00	4.00	5.6020

Table 2(b) : Analysis of variance for yeasts and moulds count/g of Khoa based Kalajam samples collected from different markets of Kanpur city and prepared in the laboratory

Sr. No.	Source of variation	D.F.	S.S.	M.S.	F. calculated value	F. Table		C.D.
						5%	1%	
1.	Control/treatment	1	193.00	193.00	95.66**	4.098	7.36	1.7049
2.	Between shops with in market (s)	2	148.48	74.24	36.80**	3.248	5.222	0.49584
3.	Between market (m)	5	34.98	6.99	3.47*	2.466	3.548	1.3555
4.	S x M	10	455.74	45.57	22.59	2.108	2.861	2.3478
5.	Error	38	76.66	2.01				
	Total	56	908.86					

	S.E. (M)	S.E. (D)	C.D.
M	0.472	0.668	1.353
S	0.334	0.472	0.957
SxM	0.818	1.157	2.343

Yeast and moulds count/g:

As is evident from Table 2 a the overall average of yeasts and moulds count/g of *Khoa* based *Kalajam* samples collected from different shops of different markets of Kanpur city was recorded $13.33x10^5$/g with the range of $6.66x10^5$/g. to $20.00x10^5$/g.

The highest average of yeasts and moulds count was recorded in *Khoa* based *Kalajam* samples collected from Govind Nagar market average $13.66x10^5$/g with the range of $11.33x10^5$/g to $16.00x10^5$/g. While the lowest yeasts and moulds count/g was recorded in *Khoa* based *Kalajam* samples collected from Nawabganj market, the average being $11.66x10^5$/g. with the range of $8.00x10^5$/g. to $15.33x10^5$/g.

The yeasts and moulds/g found in the laboratory prepared *Khoa* based *Kalajam* samples was noted average $4.0x10^5$/g with the range of $3.0x10^5$/g to $5.0x10^5$/g.

The statistical analysis of yeasts and moulds count/g showed that the variation between control vs. treatment was found highly significant at 1 per cent level of significance. The variation between market was found significant at 5% level of significance while the interaction between shops with in markets was found highly significant at 1 per cent level of significant (Table 2 b). Ghodekar *et al.* (1974 and 1980) carried out the study on yeast and moulds in indigenous milk products and microbiological quality of Indian milk products.

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