

Enhancing Storage of Paneer Using Low Cost Hurdle Technology

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Research Article

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ABSTRACT

In the present study an attempt was made to enhance the storage of paneer using hurdled technology like pickling and heat treatment. A composition of pickling ingredients was formulated and heat treatment was applied. One treatment of pickled paneer was subjected to pasteurization temperature and the other was subjected to sterilization temperature. The sensory attributes of the pasteurized pickled paneer was preferred. However microbial analysis revealed that there was a statistical difference in the microbial load between the 2 pickled samples during storage period. There was absence of coliforms in both the samples. Sterilized pickled paneer kept better and microbiologically safe in refrigerated condition for 30 days.

INTRODUCTION

Paneer is one of the popular indigenous dairy products in which the technique of acid coagulation of milk at high temperature is used to conserve wholesome and unique nutrients of milk. Paneer is a heat and acid coagulated traditional milk product, mainly consisting of milk solids obtained from the coagulation of hot milk with permitted organic acid and subsequent drainage of whey followed by pressing.

The relatively short shelf life of paneer is a major handicap in the commercial adoption of paneer manufacture. The shelf life of paneer is reported to be only 6 days under refrigeration though its freshness is lost within 3 days. At room temperature paneer does not keep good for more than one day. The heat treatment given to milk is more than enough to destroy all the pathogenic and spoilage microorganisms. Thus it is the contamination either during or post manufacturing which is responsible for this spoilage. Some of the preservation techniques include^[1]

Chilling: (5-10°C).

Brining: Paneer dipped in 5 percent brine solution lasts for nearly 20 days as against control that is spoiled after 6 days of storage at 8-10°C.

Use of chemical preservatives: Using benzoic acid (1200 ppm) under refrigeration conditions and 20 days at 37°C.

te. -13°C and -32°C for 120 days.

Vacuum packaging: Vacuum packaging of paneer in laminated pouches can help to increase its shelf life to about 30 days at 6 ± 1°C.

Materials and Methods

Preparation of paneer

Standardized milk (4.5% fat and 8.5% SNF) was used for the preparation of paneer as per the method suggested by Sukumar De^[2].

Preparation of pickling

Two sets of pickled paneer was prepared. 250 gms of paneer was cut in to small cubes and mixed with spices like garlic (20

gms), sesame oil 100 ml, salt 2% 20 gms of green chillies and 25 ml of vinegar were used as pickling spices. The spice mixture was mixed with paneer cubes and filled in a pre-sterilized wide mouthed bottle.

Heat treatment

One treatment adopted was the application of autoclaved time temperature and pressure ($120^{\circ}\text{C}/15\text{ min}/15\text{ lbs}$) combination, the second treatment was the use of pasteurization temperature of 65°C for 30 minutes followed by cooling. Sensory 9 Point Hedonic scale was used for scaling the 2 types of heat treated of pickled paneer.

Microbiology analysis

Microbiological analysis of the samples was carried out as per the method described in BIS [3] for standard plate and coliform count. Samples were subjected to microbial analysis every fortnight for a period of one month.

Storage

The 2 sets of heat treated picked paneer were stored during the study period in refrigerated condition. Statistical analysis was carried out as per the method described by Snedcor and Cochran [4].

RESULTS AND DISCUSSION

Sensory Analysis

The sensory analysis is given in **Table 1** form the table it is evident that 2 treatment samples were statistically significant and sample 1 was preferred than sample 2. This could be due to the very high heat treatment and pressure which could have affected the body and texture thus affecting the sensory attributes.

Table 1. 9 point hedonic scale rating.

Sensory attributes	Treatments		P Value
	T1	T2	
Colour and Appearance	8.83 ± 0.166	8.17 ± 0.167	*
			0.0250
Body and Texture	8.83 ± 0.167	7.67 ± 0.210	*
			0.0127
Flavour	9 ± 0.00	9 ± 0.00	NS
Mouth feel	8.83 ± 0.167	7.83 ± 0.166	*
			0.0117
Overall acceptability	8.85 ± 0.0817	8.25 ± 0.0913	*
			0.0155

Microbial Analysis

There was absence of coliform in the prepared samples this indicated the hygienic measures adopted during the preparation of pickled paneer. The Standard Plate count on Day 0 in T1 and T2 were 5.15 ± 0.2146 and 0.00 respectively (**Table 2**). On the 7th day the SPC count was 6.34 ± 0.4693 in T1 and 0.00 in T2 showing a significant difference. On day 30 the microbial count in T1 sample was statistically highly significant than T2. This indicated that sterilization is a better preservation technique which could be employed for preserving dairy products like spiced and pickled paneer in refrigerated condition. Rani et al. [5] reported that pickling process was effective in keeping bacterial count low. Pal [6] detected yeast and moulds in brine paneer and spiced paneer on the 5th day. However in the present study no yeast and mould were detected in both the samples which was in accordance to Shukla and Tripathi [7]. The low microbial count could be due to the preservative action of vinegar and oils used which was corroborated.

Table 2. Microbial analysis of the pickled samples.

Samples	Microbial load log10cfu/g			
	0th Day	7th Day	15th Day	30th Day
T1	5.15 ± 0.2146	6.34 ± 0.4693	8.58 ± 0.4474	--
T2	0.00	0.00		1.73 ± 0.2249
P value	-	-	0.002**	-

Thus it can be emphasized that the household refrigerated condition will hold pickled paneer for a period of 30 days in sterilized condition. After thirty days the sensory perception dropped thus sealing the acceptability of pickled paneer to 30 days

at refrigerated condition. Simple hurdle technology including picking process and heat treatment can be adopted as a low cost technology for enhancing the shelf life of paneer [8].

CONCLUSION

Sensory analysis revealed that pasteurized pickled paneer was preferred than sterilized pickled paneer. The pickled paneer was microbiologically safe up to 15 days in case of pasteurized pickled paneer and up to 30 days in sterilized pickled paneer. Pickling process combined with heat process was effective in prolonging the shelf life of paneer. Thus this kind of simple hurdle technology can be utilized for improved storage of paneer.

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