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Short Communication

OPTIMIZATION OF MANUFACTURING PROCESS FOR HANSI TYPE PEDA AND PROLONGATION OF ITS SHELF LIFE

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ABSTRACT

The research was conducted to optimize the manufacturing process for Hansi type peda and prolongation of its shelf life. Based upon the survey conducted on 15 randomly selected peda manufacturers and analysis of their peda samples for proximate composition, microbiological, chemical and sensory attributes as well as the laboratory studies regarding various parameters of the process of peda manufacturing and storage studies, the following technology of peda manufacturing was recommended. Milk is to be used as the base material, which contained 25 per cent of cow milk and 75 per cent of buffalo milk. After boiling of milk, citric acid @ 0.01 per cent is to be added, followed by addition of sugar @ 8 percent of milk. Boiling and desiccation of milk continued till a desired consistency of dough obtained. Potassium sorbate @ 0.20 per cent is to be mixed, and then the hot mass is transferred into trays. After cooling for 3 to 4 hrs, it is moulded into peda by hand using sterilized gloves and then packed in cardboard boxes of desired sizes with parchment lining, followed by sealing in polyethylene sachets. Addition of 0.20 per cent of potassium sorbate was found adequate to extend the shelf life of peda for 10 to 15 and 30 to 45 days at 37 ± 1 ºC and 5-8 ºC, respectively. However, the product is to be stored at 5-8 ºC till its marketing.

Keywords: Biochemical, Chemical quality, Manufacturing Process, Peda

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Khoa is heat denatured and concentrated milk product used for preparation of khoa based sweets, like gulabjamun, burfi, Peda etc. Peda is a product obtained by addition of sugar to the partially desiccated milk known as khoa. Peda, in comparison with burfi is granular with harder texture and having a longer keeping quality. Regional preferences for quality determine the method of preparation, as a result of which the sensory and chemical attributes of the product vary considerably. Some prefer white colour of peda, while others ask for brownish colour. The art of preparing sweet from surplus milk has been developed for commercial advantages by halwais to meet the local needs of the people. The chemical composition, taste and texture properties of products vary to a great extent. The microbiological quality of the product is also inferior. In many of these products, the occurrence of a large number of undesirable microorganisms including the enterotoxin producing staphylococci and preformed heat stable toxins, would call for adoption of hygienic measures at all levels of handling.

There is no standard technique available to be followed for the large scale peda manufacture, while there is also a vast scope for the export of such indigenous products to middle and far eastern countries as well as western countries, if the product is manufactured under standard and hygienic condition.

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The study was carried out in the laboratory of Department of L.P.T. LUVAS, Hisar, Haryana. A good quality of raw buffalo milk and cow milk was taken from department of L.P.T. LUVAS, Hisar for preparation of laboratory peda. Samples of peda from fifteen selected manufacturers of Hansi and Hisar cities were collected in triplicate from retail counters and kept in icebox containing ice crystals. Thus, a total of 45 samples were taken to the laboratory and stored in refrigerator till analysis. Analysis was carried out in least possible time (within 24 hours). Peda samples were examined for chemical, microbiological and sensory qualities. The technology of the respondent producing the best product with some modification was followed for further studies in the laboratory.

The appropriate sizes (30-50 gm) of peda balls were prepared and wrapped in parchment paper. The packaged samples were kept in food grade polyethylene bags for storage studies to prevent contamination and further evaporation of moisture from the product. The samples of peda were analyzed for physico-chemical, microbiological and sensory characteristics at the intervals of 5,10 and 15 days of storage at 37±1 ºC and 15, 30 and 45 days of storage at 5-8 ºC, respectively. Sensory evaluation of peda was conducted by a panel of six semi trained judges from the faculty members of Department of LPT, LUVAS, Hisar, using 9- point Hedonic scale. Microbiological quality of peda samples were assessed by standard plate count,

coliform count, staphylococci count and yeast and mould count by the method as described in ISI Handbook of Food analysis, SP: 18 (Part XIII)-1984 and B.I.S (1989). The cost of manufacture of peda was estimated according to the guidelines of Patel and Arora (1976). Data generated from study was processed on a computer by using statistical software package for agricultural research workers developed by Sheoran *et. al.* (1998).

In the present investigation, buffalo milk and its combinations with cow milk (100:0, 75:25 and 50:50) were used for conversion into peda. The yield and proximate composition of peda were not affected significantly on the replacement of 25 per cent of buffalo milk with cow milk. The replacement of 25 per cent buffalo milk with cow milk, the effect observed on sensory attributes was not significant ($P < 0.05$). Significant ($P < 0.05$) increase in the sucrose, s.n.f and yield of product were noticed on increasing levels of sugar added, while protein, fat and lactose contents had shown reverse trend. The moisture, total solids and ash were not affected significantly. Statistically manufacturing techniques studied had no significant ($P < 0.05$) effect upon the proximate composition as well as the yield of product. The manufacturing techniques had significant ($P < 0.05$) effect on flavour, body and texture as well as on overall acceptability scores of peda, while colour and appearance score was affected non-significantly. The statistical analysis indicated that sensory score of peda prepared with MT-2 technique was highest among all the three techniques studied. The use of citric acid in fresh milk or in fresh khoa seems to be helpful to obtain a desired grainy texture in peda.

Shelf life study of peda samples prepared by adding two levels of potassium sorbate i.e 0.20 and 0.30 per cent of the product added was carried out. A total decrease of 0.47 to 0.60 per cent was observed in protein content of peda during 45 days of storage. Inspite of decrease in moisture content of peda on storage, the decrease in protein content might be due to their microbial break down.

The titratable acidity of control samples increased significantly ($P< 0.05$) after 15 days of storage while that of potassium sorbate preserved samples irrespective of the level of treatment, the acidity increased significantly ($P< 0.05$) after 45 days of storage. A significant ($P< 0.05$) decrease in the pH value was observed at every corresponding interval of analysis in control samples, whereas in treated samples, a significant change was observed at 45th day of storage. The statistical analysis of data revealed that the treatment, storage period as well as their interaction had not shown any significant ($P< 0.05$) effect on protein content of peda stored at 37+1 ºC. There was a fairly rapid and continuous increase in the SPC, *Staphylococcus* count, coliform count and yeast and mould count in control samples of peda on storage. A significant ($P< 0.05$) increase in bacterial as well as yeast and mould count was observed after 10th and 15th day of storage in treated samples containing 0.20 and 0.30 per cent of potassium sorbate, respectively.

Table 1

Biochemical, microbiological and sensory characteristics of market and laboratory made peda (Mean ± S.E.)

S.No.	Characteristics	Market (n = 45)	Laboratory (n = 3)
1.	Total solids (%)	86.08±1.99	86.81±0.03
2.	Fat (%)	16.24±2.41	20.04±0.01
3.	Protein (%)	11.21±0.94	14.27±0.03
4.	Lactose (%)	18.49±0.97	20.64±0.13
5.	Ash (%)	2.63±0.23	2.80±0.09
6.	Sucrose (%)	37.52±2.62	32.45±0.18
7.	FFA (% oleic acid)	0.056±0.003	0.051±0.004
8.	Peroxide value (meq.O_2/kg.fat)	1.72±0.14	1.41±0.01
9.	Titratable acidity % lactic acid	0.43±0.03	0.45±0.02
10.	pH	6.34±0.11	6.44±0.02
11.	SPC (log cfu/g)	5.63±0.44	3.63±0.36
12.	Coliform (log cfu/g)	4.09±1.07	1.50±0.28
13.	Staphylococcus count (log cfu/g)	4.71±0.29	2.56±0.16
14.	Yeast and mould	3.66±2.05	2.36±0.24
15.	Flavour	7.69±0.30	7.87±0.11
16.	Body and texture	7.62±0.26	7.83±0.50
17.	Colour and appearance	7.84±0.27	8.37±0.72
18.	Overall acceptability	7.70±0.30	7.87±0.50

Various compositional, chemical, microbiological and sensory characteristics of market and laboratory made samples of peda have been compared in Table 1. It is clear from the table that all the characteristics analyzed differed when the samples from the market and laboratory were compared. Fat, total solids, protein, ash and lactose contents were lower in market samples, while the sucrose content was higher as compared to laboratory made samples. The titratable acidity and pH were found almost comparable in market and laboratory samples, while FFA and peroxide values were comparatively higher in market samples. Among the microbial groups enumerated, the values of SPC, coliform count, *Staphylococcus* count and yeast and mould count in market samples were higher as

compared to laboratory samples. Sensory attributes were found to be higher in case of laboratory samples as compared to market samples. The laboratory made samples ranked higher in quality as compared to market samples. Variations in the quality of peda between the market and laboratory made samples have also been reported by Patel (1985) and Patel (1986). A wide range of variation in all the quality parameters studied have been observed in market samples of peda as indicated by the larger standard, deviation in comparison to laboratory samples. These variations are in full agreement with Garg and Mandokot (1984), Reddy and Rajorhia, (1992). These observations showed that there is an urgent need to adopt a standard technology of peda manufacturing to get a more uniform quality product.

CONCLUSION

Based upon the survey conducted on 15 randomly selected peda manufacturers and analysis of their peda samples for proximate composition, microbiological, chemical and sensory attributes as well as the laboratory studies regarding various parameters of the process of peda manufacturing and storage studies, the following technology of peda manufacturing was recommended.

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