

STUDY ON SENSORY, PHYSICO-CHEMICAL AND BACTERIAL QUALITIES OF MARKET SAMPLES OF *PEDA* SOLD IN HISAR AND HANSI CITY

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SUMMARY

Peda is an indigenous milk sweet made from dessication of milk with the addition of sugar as a sweetening agent. *Peda* is being manufactured by 'halwais' using different traditional methods. Hence, there could be variation in chemical, compositional, microbiological and sensory characteristics of *peda*. A survey of existing technology of *peda* manufacturer in Hansi and Hisar cities was carried out with the help of a pretested interview schedule. Fifteen *peda* manufacturers, 10 from Hisar city and five from Hansi city were selected randomly. The samples of *peda* were collected from these, to assess proximate composition, microbiological, chemical and sensory attributes. A wide variation in proximate composition of *peda* marketed in Hisar and Hansi cities was found. The composition of *peda* samples of the two manufacturers were found more satisfactory regarding their microbiological, chemical and sensory attributes. These manufacturers used milk as the base material in preparation of *peda*.

Keywords: Biochemical quality, Chemical quality, Microbiological quality, *Peda*, Sensory

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Indigenous dairy products have played an important role in the socio-economic life of our people since time immemorial. As high as 45 to 50 per cent of the total milk produced in India is converted into these products. On the other hand, only 5-6 per cent of milk is converted into the western type of dairy products handled in the organized sector. *Khoa*, an important Indian milk product and it is estimated that at present about one million tons of *khoa* is produced annually, which is equivalent to 5.5 per cent of India's total milk production.

In and around Hisar region, a typical white coloured and granular *peda* is prepared by local *halwais* known as Hansi type *peda*, which is marketed in local markets only. The quality of *peda* is better when made from buffalo milk. 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 hygienic condition.

The study was carried out in the laboratory of department of Livestock Products Technology, LUVAS, Hisar, Haryana. Samples of *peda* from fifteen selected manufacturers of Hansi and Hisar cities were collected in triplicate from retail counters in polyethylene bags 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 within 24 hours. *Peda* samples were examined for physico-chemical, microbiological and sensory qualities. Fat, total solids, S.N.F, protein, lactose, sucrose, ash, moisture, titratable acidity contents, pH, free-fatty acids and

peroxide value of *peda* samples were determined as per methods described in B.I.S (1989). Sensory evaluation of *peda* samples was conducted by a panel of six semi trained judges from the faculty members of LUVAS, Hisar, using 9-point Hedonic scale. Microbiological quality of *peda* samples were analysed for 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). Data generated from study was processed on a computer by using statistical software package for agricultural research workers developed by Sheoran *et al.* (1998).

The proximate composition of *peda* samples procured from the selected 15 manufacturers is presented in Table 1. A wide variation in proximate composition of *peda* marketed in Hisar and Hansi cities was found. These results are in harmony with Rajorhia and Sen (1987) who have also reported a similar variation in market samples of *peda*. This wide variation in proximate composition of market samples of *peda* may be attributed to the quality of milk used, quantity of sugar added and moisture content retained in the finished product. The wide variation in chemical composition of *peda* indicated that there is a need for standardization of the technique of *peda* manufacture, so that *peda* of uniform quality can be manufactured for the large scale marketing of the product. The proximate composition of *peda* samples of the two manufacturers at serial no. 5 and 6 was found more satisfactory in comparison to the samples of other respondents. The sugar content in *peda* of these two respondents was lower, while protein, fat and lactose contents were on higher side. The moisture content in *peda* of these samples was optimum.

The data pertaining to microbiological quality of

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Table 1. Proximate composition of market samples of *peda* sold in Hisar city

Sample no.	Fat %	T.S.%	S.N.F.%	Protein %	Lactose%	Sucrose %	Ash %	Moisture %
1.	10.54	84.82	74.28	11.88	18.10	41.89	2.41	15.18
2.	15.79	82.17	66.39	11.73	18.69	33.19	2.78	17.83
3.	11.09	85.64	74.55	11.83	20.20	39.57	2.95	14.36
4.	16.24	84.63	68.39	11.57	19.53	34.96	2.32	15.37
5.	18.16	87.14	68.98	12.73	19.52	33.88	2.85	12.86
6.	18.50	87.24	68.74	12.93	18.29	34.47	3.05	12.76
7.	15.59	85.47	69.88	11.85	17.48	38.39	2.16	14.53
8.	17.10	89.08	71.98	12.38	18.33	38.92	2.35	10.92
9.	18.07	86.94	68.87	10.02	17.10	39.04	2.71	13.06
10.	17.51	85.40	67.89	11.97	18.31	34.84	2.77	14.60
11.	18.61	84.28	65.67	10.72	18.70	33.38	2.87	15.72
12.	18.59	88.77	70.18	10.78	19.48	37.17	2.76	11.23
13.	17.97	86.71	68.74	9.83	20.13	36.04	2.75	13.29
14.	17.57	87.63	70.06	10.66	17.37	39.21	2.83	12.37
15.	18.24	89.36	71.12	9.23	18.13	41.05	2.71	10.64
Average (n=45)	16.37+2.41	86.00+1.988	69.81+2.47	11.27+0.937	18.53+0.974	37.37+2.62	2.65+0.233	13.83+1.988
Range	10.54-18.61	82.17-89.36	65.67-74.55	9.23-12.93	17.10-20.20	33.19-41.89	2.16-2.95	10.64-17.83

Values are average of three replications and average values +SD

peda samples in terms of standard plate count, coliform count, *Staphylococci* count and yeast and mould count is presented in table 2. The microbiological quality of *peda* samples of various respondents was generally poor that may be attributed to improper hygienic conditions followed by the manufacturers during processing, storage and handling of the product. These findings are in agreement with that of Garg and Mandokhot (1984). All the microbial counts of *peda* samples at sr. no. 5 and 6 were comparatively lower than the samples of other manufacturers.

The chemical characteristics of *peda* samples obtained from 15 manufacturers are presented in Table 3. A wide variation in titratable acidity, pH, free fatty acids and peroxide value of *peda* samples was observed. A similar variation in these characteristics of market samples of *peda* has been obtained by Biradar *et al.* (1985) and Kumar *et al.* (1997). A wide variation in chemical quality of *peda* samples shows the need for taking appropriate measures in the manufacture, storage and handling of the product, so that the consumers get a satisfactory quality of the product.

The sensory score of samples of *peda* collected from the 15 selected manufacturers is presented in Table 4. The scores for various sensory attributes such as flavour, body and texture, colour and appearance and overall acceptability of *peda* samples at sr. no. 5 and 6 were on higher side in comparison to the samples of other manufacturers. The flavour defects noticed in *peda* samples of other manufacturers were mainly excessive sweetness and lack of freshness, while body and texture defects included mainly brittleness or fragileness, harder body and lacking or excessive grainy texture. The excessive sweetness might be attributed to the excessive use of sugar in *peda* manufacture, aiming to get a higher yield of the product to earn more profit. Lack of freshness might be either due to a longer storage of the

Table 2. Microbiological quality (log CFU/g) of market samples of *peda* sold in Hisar city

Sample No.	Standard Plate count	Coliform count	<i>Staphylococci</i> count	Yeast & Mould count
1	5.60	4.47	4.68	3.63
2	5.66	4.50	4.70	3.83
3	5.77	4.17	4.76	3.56
4	5.79	3.84	4.74	3.73
5	4.73	3.40	4.35	2.59
6	4.67	4.00	4.61	3.56
7	4.66	3.63	4.55	3.60
8	5.78	4.04	4.71	3.59
9	5.75	3.60	4.58	3.62
10	4.65	4.00	4.62	3.69
11	5.82	3.95	4.82	3.77
12	5.82	4.18	4.76	3.81
13	5.62	4.05	4.85	3.74
14	5.80	4.07	4.87	3.65
15	5.55	4.07	4.87	3.65
Average (n=45)	5.61+2.24	4.16+1.07	4.71+0.74	3.66+0.29
Range	4.65-5.82	3.40-4.50	4.35-4.87	2.59-3.83

Values are average of three replications and average values±SD

product or the use of poor quality milk. Brittleness or fragileness with harder body might be mainly due to excessive evaporation of the product before removing source of fire or by use of excessive amount of granulating agent. Lack of grainy texture or excessive graininess might be attributed to non- use of granulating agent, such as citric acid or its excessive use, since it was added without proper measurement. Lack of white colour or brownish or yellowish colour in the product might be attributed to the excessive use of cow milk or uncontrolled heat treatment and scraping during boiling of milk or during dough

formation. An improper shape and size along with other defective attributes might be resulting in poor score of overall acceptability of the product.

The results of the sensory score and remarks given by the judges indicated that most of the *peda* samples collected during survey were having excessive sweetness and various body and textural defects. The samples of only two of the respondents had a score of 8 or above indicated that the product was liked very much by the judges. The samples of twelve respondents were liked moderately, while samples of only one respondent were liked slightly.

CONCLUSION

A wide variation in proximate composition of *peda* marketed in Hisar and Hansi cities was found. The composition of *peda* samples of the two manufacturers at serial no. 5 and 6 were found more satisfactory regarding their microbiological, chemical and sensory attributes than the samples of other respondents. Hence, technology and methodology followed by these two *peda* manufacturers were taken as the base technology used further in laboratory studies. These respondents used milk as the base material in manufacture of *peda*.

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Table 3. Chemical quality of market samples of *peda* sold in Hisar city

Sample No.	Titratable Acidity	pH	Free fatty acids %	Peroxide value (m.eq O ₂ / Kg fat)
1	0.40	6.41	0.052	1.50
2	0.43	6.33	0.055	1.62
3	0.47	6.35	0.057	1.70
4	0.48	6.38	0.055	1.60
5	0.40	6.38	0.051	1.50
6	0.40	6.33	0.050	1.51
7	0.42	6.49	0.057	1.75
8	0.40	6.44	0.055	1.78
9	0.40	6.41	0.059	1.56
10	0.43	6.21	0.060	1.87
11	0.45	6.23	0.057	1.58
12	0.43	6.20	0.055	1.81
13	0.41	6.47	0.065	1.84
14	0.45	6.24	0.067	1.82
15	0.43	6.29	0.065	1.77
Average (n=45)	0.42±0.027	6.34±0.110	0.055±0.003	1.68±0.138
Range	0.40-0.48	6.20-6.49	0.052-0.067	1.50-1.87

Values are average of three replications and average values±SD

Table 4. Sensory score (9.0 points scale) of market samples of *peda* sold in Hisar city

Sample No.	Flavour	Body and texture	Colour and appearance	Overall acceptability	Remarks
1	7.08	6.92	7.00	6.86	Dryness, brittle texture, poor flavour
2	7.83	7.58	7.92	7.75	More sweet, slightly hard body
3	7.42	7.44	7.64	7.33	More sweet, hard body, fragile texture
4	7.83	7.64	7.72	7.67	More sweet, hard body, fragile texture
5	8.17	8.11	7.95	8.09	Good product
6	8.03	7.86	7.95	8.00	Good product
7	7.94	7.67	8.00	7.86	More sugar, sandiness
8	7.81	7.68	7.73	7.80	Slightly more sugar, smooth texture
9	7.53	7.61	8.03	7.72	More sweet, hard, lacking freshness
10	7.61	7.70	7.86	7.72	More sweet, hard body, fragile texture
11	7.92	7.61	7.89	7.81	Slightly more sugar, pasty texture
12	7.28	7.50	7.89	7.56	More sweet, hard fragile texture
13	7.64	7.59	8.14	7.80	Slightly more sugar, smooth texture
14	7.44	7.53	7.83	7.61	More sweet, soft body, fragile texture
15	7.89	7.92	8.11	7.97	Slightly more sugar, granular texture
Average (n=45)	7.69±0.301	7.62±0.260	7.84±0.272	7.70±0.298	
Range	7.08-8.17	6.92-8.11	7.00-8.14	6.86-8.09	

Values are average of three replications and average values ± SD