

RESEARCH PAPER

Consumer responsibility of low sugar, low calorie and fibre enriched *Lal Peda*B.C. ANDHARE*, D.C. RAI AND TANWEER ALAM¹

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ABSTRACT

Varanasi, the city of gallis and ghats is not only famous for its *Banarasi saree* and *Banarasi paan*, but also famous for the *Lal Peda* loaded with higher amount of sugar and loaded with *Ghee*, the *Peda* is shaped by hand and dusted with semolina and pistachios as a finishing touch. *Lal Peda* is a popular heat desiccated traditional dairy delicacy of eastern India specially Uttar Pradesh. It is prepared by blending of *Khoa* and sugar followed by heat desiccation until characteristic reddish brown colour appears. The *Lal Peda* is deficit in fibre so the developed *Lal Peda* was prepared with addition of oat. This product is manufactured since long time yet not glamorized as other *Khoa* based sweet products like *Burfi*, *Peda* etc. The main reason behind this is, these products centered into specific areas and have not proper focused by research scientists and extension workers. So the experiment was carried out on low calorie, low sugar and fibre enriched *Lal Peda*. The process for the manufacture of low calorie, low sugar and fibre enriched *Lal Peda* was standardized. Optimization of product stages and levels of addition of maltodextrin, sorbitol, oat, sugar and aspartame were used with help of sensory evaluation score. Hence, the formulation with buffalo milk with 3 per cent fat, 2 per cent maltodextrin, 0.50 per cent oat on the basis of milk and 20 per cent sugar and 0.10 aspartame on the basis of *Khoa* were considered to be the most appropriate formulation for preparation of low sugar, low calorie and fibre enriched *Lal Peda*. The proximate composition of developed *Lal Peda* contained 17.95 per cent moisture, 14.28 per cent fat, 16.93 per cent protein, 13.58 per cent lactose, 20.18 per cent sugar, 3.18 per cent ash and 4.18 per cent dietary fibre. The developed *Lal Peda* samples were tasted to 125 consumers selected randomly. The consumers were picked-up randomly under different age, sex and health groups. Among the consumers suffering from various diseases 93.5 per cent consumers rated the product liked extremely and liked very much.

Key Words : Low sugar, Low calorie, Fibre, *Lal Peda*, Consumer responsibility

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In India most of traditional dairy product contains high fat and also high sugar (Pal and Raju, 2007). *Peda* and *Burfi* are the two major *Khoa* based sweets, which are highly popular among Indians, mainly because of their delicious taste and high nutritional value. It has been reported that the quantity of *Peda* produced in India exceeds any other indigenous milk based sweet (Mahadevan, 1991). Fat replacers sometimes referred

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as fat substitutes or fat replacements are ingredients that mimic some of the roles of fat in food processing. The ideal fat replacer is a safe compound consumed with no health risk. It has all the functional and organoleptic properties of fat (taste and appearance characteristics such as richness, flakiness and sheen) with significantly fewer calories than fat (Hope Warshaw and Marion Franze, 1996).

It can serve as an excellent carrier product for extra nutrient and if enriched or fortified it can satisfy the nutritional needs of the people (Krupa *et al.*, 2011). In India most of traditional dairy food contains high fat and also high sugar (Pal and Raju, 2007).

Oat :

Oats are generally, considered 'healthful', or a health food, being touted commercially as nutritious. The discovery of their cholesterol-lowering properties has led to wider appreciation of oats as human food.

Soluble fibre in Oat :

Consumption of oat is believed to lower LDL (bad) cholesterol and possibly to reduce the risk of heart disease. Oats contain more soluble fibre than any other grain, resulting in slower digestion and an extended sensation of fullness. Oat protein is nearly equivalent in quality to soy protein, which World Health Organization research has shown to be equal to meat, milk and egg protein.

Lal Peda :

Varanasi, the city of galls and ghats is not only famous for its *Banarasi saree* and *Banarasi paan*, but also famous for the *Lal Peda* loaded with high sugar and loaded with *Ghee*. *Lal Peda* is a popular heat desiccated traditional dairy delicacy of eastern India specially Uttar Pradesh. Very little attention is paid to packaging and sanitary handling practices (Patil, 2003). On the commercial scale, the low shelf of products is big challenge faced by the manufacturer (Mishra, 2000; Aneja *et al.*, 2002 and Patil and Pal, 2005). *Lal Peda* is produced and marketed has limited shelf-life of 5-7 days and consumed fresh. For making it popular outside the traditional manufacturing region, there is a need to have its higher shelf-life.

Consumer response of low sugar, low calorie and fibre enriched Lal Peda :

The actual consumer response to a newly developed

low sugar, low calorie and fibre enriched *Lal Peda* constitutes an important attribute of its worthiness. In order to elucidate the acceptability of finished product it was necessary to expose it to the fairly large number of consumers and seek their opinion about the product. A fresh lot of low sugar, low calorie and fibre enriched *Lal Peda* was prepared for consumer acceptability. The developed *Lal Peda* was tasted by 125 consumers to know their response. The consumers were picked-up randomly under different age, sex and health groups. A questionnaire was provided to the consumers along with the developed *Lal Peda*.

RESEARCH METHODOLOGY

Low sugar, low calorie and fibre enriched *Lal Peda* was prepared in the Laboratory of Animal Husbandry and Dairying and Centre of Food Science and Technology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi.

Buffalo milk :

Buffalo milk was standardized to 3 per cent fat and 9 per cent SNF.

Artificial sweetener :

Artificial sweeteners *i.e.* aspartame was purchased from market, Varanasi, U.P.

Sugar :

Good quality sugar was obtained from the local market of Varanasi, Uttar Pradesh.

Bulking agents :

High quality bulking agents *i.e.* maltodextrin and sorbitol were purchased from the local market of Varanasi, Uttar Pradesh.

Oat :

High quality oat was purchased from the local market of Varanasi, Uttar Pradesh.

Statistical analysis :

All the data were expressed as mean \pm standard deviation of mean and was calculated from three independent experiments. One-way analysis of variance (ANOVA) using Completely Randomized Design (CRD) was applied.

RESULTS AND REMONSTRATION

From the Table (1) the overall frequency distribution of consumer’s acceptability trial revealed that out of 125 consumers (100%), 43 consumers (34.4 %) rated as liked extremely, whereas 53 (42.4%), 18 (14.4 %) and 11 (8.8 %) consumers rated the product as, liked very much, liked moderately and liked slightly, respectively. Over 75 per cent consumers rated the product liked extremely and liked very much acceptability score. None of the consumers rated the product below the acceptable score *i.e.* 6.0.

Table 2 shows that the frequency distribution of consumer’s acceptability of the low sugar, low calorie and fibre enriched *Lal Peda* on the basis sex group. Out of 125 consumers the finished product was offered to 91

males (72.8 %) and 34 females (27.2). Among the male consumers 31 (24.8 %) rated as liked extremely whereas the 39 (31.2%) and 13 (10.4%) rated the product as, liked very much and liked moderately, respectively. Only 8 (6.4%) male consumers rated the product as liked slightly. Among the female consumers 12 (9.6 %) rated the product as liked extremely whereas the 14 (11.2) and 5 (4.0%) female consumers rated the product as, liked very much and liked moderately, respectively. Only 3 (2.4 %) female consumers rated the product as liked slightly.

Table 3 shows that the frequency distribution of consumer’s acceptability of the low sugar, low calorie and fibre enriched *Lal Peda* on the basis of different age groups (years). Out of 125 consumers the finished product was offered to 19 consumers (15.2 %) below

Table 1 : Overall frequency distribution of consumer’s acceptability of the low sugar,low calorie and fibre enriched *Lal Peda*

Acceptability	Number of consumers	Per cent
Liked extremely-9	43	34.4
Liked very much-8	53	42.4
Liked moderately-7	18	14.4
Liked slightly-6	11	8.8
Total	125	100

Table 2 : Frequency distribution of consumer’s acceptability of the low sugar, low calorie and fibre enriched *Lal Peda* on the basis sex group

Acceptability	Male	Per cent	Female	Per cent
Liked extremely-9	31	24.8	12	9.6
Liked very much-8	39	31.2	14	11.2
Liked moderately-7	13	10.4	5	4.0
Liked slightly-6	8	6.4	3	2.4
Total	91	72.8	34	27.2

Table 3 : Frequency distribution of consumer’s acceptability of the low sugar, low calorie and fibre enriched *Lal Peda* on the basis of different age groups (Years)

Acceptability	Age groups (Years)							
	Below 20	Per cent	20-40	Per cent	40-60	Per cent	Above 60	Per cent
Liked extremely-9	01	0.8	11	8.8	19	15.2	12	9.6
Liked very much-8	04	3.2	22	17.6	18	14.4	09	7.2
Liked moderately-7	08	6.4	07	5.6	02	1.6	01	0.8
Liked slightly-6	06	4.8	04	3.2	01	0.8	00	0.0
Total	19	15.2	44	35.2	40	32.0	22	17.6

Table 4: Frequency distribution of consumer’s acceptability of the low sugar, low calorie and fibre enriched *Lal Peda* on the basis health group

Acceptability	Normal	Per cent	Diabetic	Per cent	Heart disease	Per cent	Obese	Per cent
Liked extremely	3	2.4	8	6.4	8	6.4	11	8.8
Liked very much	35	28	21	16.8	3	2.4	7	5.6
Liked moderately	18	14.4	2	1.6	0	0.0	1	0.8
Liked slightly	7	5.6	0	0.0	1	0.8	0	0.0
Total	63	50.4	31	24.8	12	9.6	19	15.2

the 20 years age groups, 44 (35.2 %) age group between 20 to 40 years, 40 (32.0 %) age group between 40 to 60 years and 22 (17.6 %) age group above 60 years. Among the below 20 years age groups only one consumer (0.8 %) rated the product liked extremely whereas the 04 (3.2%) and 08 (6.4%) rated the product as, liked very much and liked moderately, respectively and only 06 (4.8%) consumers rated the product as liked slightly. Among the age group of 20 to 40 years, 11 consumers (8.8 %) rated the product liked extremely whereas the 22 (17.6%) and 07 (5.6%) rated the product as, liked very much and liked moderately, respectively and only 04 (3.2%) consumers rated the product as liked slightly. Among the age group of 40 to 60 years 19 consumers (15.2%) rated the product liked extremely whereas the 18 (14.4%) and 02 (1.6%) rated the product as, liked very much and liked moderately, respectively and only one consumer (0.8%) rated the product as liked slightly. Among the above 60 years age groups 12 (9.6 %) consumers rated the product liked extremely whereas the 09 (7.2%) and 01 (0.8%) rated the product as, liked very much and liked moderately, respectively and none of the 22 consumers above 60 years of age rated the product as liked slightly. It is concluded that the product is very much liked by the consumers above the age group of above 20 years as compared to consumers of the age group of below 20 years.

Table 4 shows that the frequency distribution of consumer's acceptability of the low sugar, low calorie and fibre enriched *Lal Peda* on the basis of different health groups. Out of 125 consumers the finished product was offered to 63 consumers (50.4 %) of normal health group, 31 (24.8 %) diabetics group, 12 (9.6 %) consumers suffering from heart disease and 19 (15.2 %) obese group. Among the normal health group out of 63 consumers, 03 (2.4 %) rated the product liked extremely whereas the 35 (28.0%) and 18 (14.4%) rated the product as, liked very much and liked moderately, respectively and only 07 (5.6%) consumers rated the product as liked slightly. Among the diabetic group 08 consumers (6.4 %) rated the product liked extremely whereas the 21 (16.8%) and 02 (1.6%) rated the product as, liked very much and liked moderately, respectively. None of the consumer from diabetic group rated the product as liked slightly. Among the consumers suffering from heart disease, 08 consumers (6.4%) rated the

product liked extremely whereas the 03 (14.4%) and 01 (0.8%) rated the product as, liked very much and liked slightly, respectively and none of the consumers from heart disease rated the product as liked moderately. Among the obese groups 11 (8.8 %) consumers rated the product liked extremely whereas the 07 (5.6%) and 01 (0.8%) rated the product as, liked very much and liked moderately, respectively. None of the consumers from obese group rated the product as liked slightly. It is concluded that out of 62 (100 %) consumers suffering from diabetic, heart diseases and obesity, 58 (93.5%) consumers liked the product extremely and very much.

Conclusion :

From consumer response trial it is quite logical to conclude that the low sugar, low calorie and fibre enriched *Lal Peda* received wide acceptance by all group of consumers specially those consumers suffering from various diseases like diabetes, obesity and heart related problems. It is believed that the product surely shall attract a very wide market acceptance.

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