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## Studies on sensory attributes of sugar free peda manufactured from buffalo milk and soya milk

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### Abstract

Buffalo milk is preferred for khoa making because it yields a whiter product with a soft, loose body and a smooth granular texture which is suitable for the preparation of high-grade khoa sweets and higher yield of khoa. Peda is a khoa based indigenous milk product, popular all over India. Soybean provides high quality protein with minimum saturated fat. It contains all the three nutrients viz., carbohydrate, protein and fat as well as fiber, vitamins and minerals. Soymilk contains no lactose, which makes it a good alternative for lactose-intolerant. Aspartame is most popular artificial sweetener and sugar substitute with very low calorific value. The present study of sugar free peda manufactured from soya milk and buffalo milk was prepared from different preparation of soya milk and aspartame. The product obtained was subjected for organoleptic evaluation by panel of judges. The present investigation shows that, the colour and appearance, flavour, body and texture and overall acceptability of the sugar free peda prepared with 13 percent soya milk and 7 percent aspartame in treatment T<sub>2</sub> are (8.28), (8.52), (8.42) and (8.19) was highest and superior. It was also observed that the overall acceptability score of peda with soya milk and aspartame was found to be treatment T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 7.93, 7.64, 8.19 and 7.49 respectively. Treatment T<sub>2</sub> was more acceptable in all treatments in colour and appearance, flavour, body and texture and overall acceptability.

**Keywords:** Sensory attributes, sugar free peda manufactured, buffalo milk, soya milk

### Introduction

In India, about 50% of the total milk produced is converted into various traditional milk products (Rao and Raju, 2003) [12]; (Bhasin, 2010) [5]; (NDDDB, 2014) [11]. Buffalo milk is preferred for khoa making because it yields a whiter product with a soft, loose body and a smooth granular texture which is suitable for the preparation of high-grade khoa sweets. Khoa, the principal heat desiccated traditional Indian dairy product, is used as a base material for a huge variety of sweet delicacies. It is also called as khoya or mawa. Beniwal *et al.*, (2010) [4] standardized the buffalo milk for the production of khoa through a semi-automatic machine based on physico-chemical parameters and sensory evaluation, fat/SNF ratio of 0.61 in milk was found to be the most suitable for preparation of khoa. Peda is a khoa based indigenous milk product and popular all over India. According to industry estimates, the production of peda exceeds that of any other indigenous milk based sweet (Aneja *et al.*, 2002) [2]. Peda is prepared by mixing khoa with copious quantities of sugar usually in the ratio 3:1. Sugar provides the preservative and giving a long shelf life of peda. Cardamom being commonly added for the flavouring of peda. Peda is whitish yellow in colour and has a coarse grainy texture. Peda quality is determined by the quantity of sugar added, heating parameters and storage condition.

Soybean provides high quality protein with minimum saturated fat. It contains all the three nutrients such as carbohydrate, protein and fat required for good nutrition, as well as fiber, vitamins and minerals. It contains high poly unsaturated fatty acid. Soybean has more than twice the amount of minerals especially calcium, zinc, iron and phosphorus than any other legume (Itapu, 2003) [9] and Venter, 2004) [14]. Soy protein is highly digestible (92 to 100 per cent) and contains all essential amino acids. Soy protein products contain high concentration of isoflavones that exerts protective properties against breast, prostate, colon and lung cancers (Kirupa *et al.*, 2011) [10]. Soya milk is a beverage made from soybeans. It is being a rich source of nutrients, soybean has a number of phytochemicals, which offer health benefits such as cancer prevention, cholesterol reduction and combating osteoporosis, many soya products have limited human use in the western hemisphere due to undesirable off flavors. Soy protein lowers blood cholesterol levels (Hodges *et al.*, 1967) [7]. Soy protein is also better than animal protein for health (Hoie *et al.*, 2007) [8].

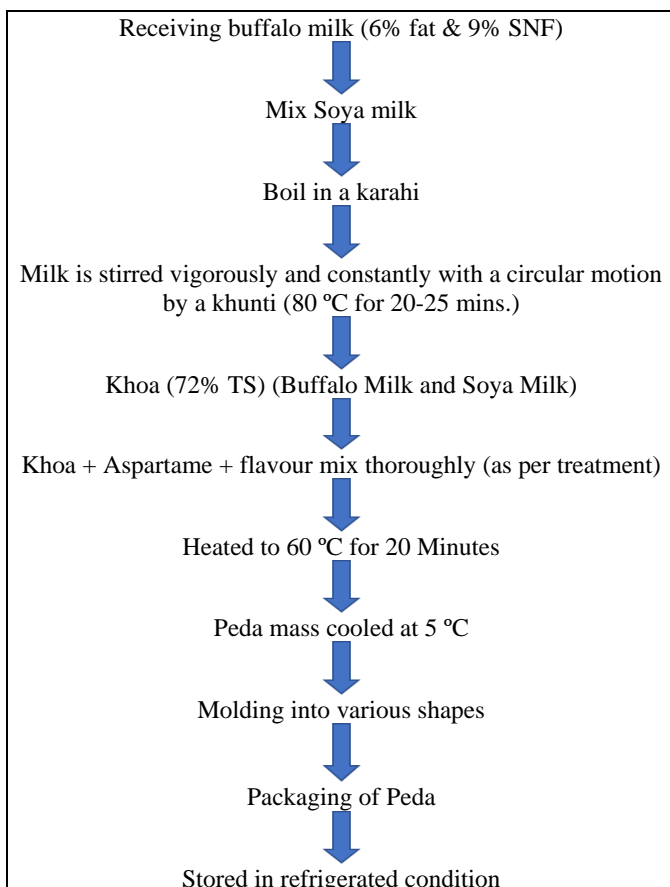
Aspartame is a synthetic dipeptide sweetener, which is almost 180-200 times sweeter than sucrose. Aspartame is very much popular owing to its reduced costs, low caloric value and assurance to contribute in weight management. The popularity of aspartame among consumers lies down within the problems associated with sucrose consumption (Tandel KR, 2011) [13]. In diabetic people difficulty in regulating their blood sugar levels restrict the consumption of normal sugar. This is due to the fact that diabetics do not have sufficient levels of insulin, a hormone that controls sugar uptake in the bloodstream. Aspartame helps in limiting the sucrose intake in the form of substituting sugar and releases very low amount of energy. Aspartame is metabolized more slowly than sucrose and allowing blood sugar levels to remain more stable over time. Individuals with reactive hypoglycemia produce an excess of insulin after quickly absorbing glucose into the bloodstream (Bellisle and Drewnowski, 2007) [3]. This causes their blood glucose levels to fall below the amount needed for physiological function of body. Like diabetic, high glycemic food avoidance often forces to choose artificial sweeteners as an alternative.

### Materials and Methods

The experiment “Studies on sensory score of sugar free peda manufactured from buffalo milk and soya milk” was carried out in research lab, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj-211007, U.P. (India).

### Procurement and collection of ingredients

Buffalo Milk, soya milk, cardamom nuts and flavouring agents were purchased from local market of Prayagraj. Aspartame was procured from Lucknow.



**Fig 1:** Flow diagram for manufacturing of Buffalo milk Peda

### Treatment Combination

T<sub>0</sub>: Buffalo milk (100:00:00)

T<sub>1</sub>: Buffalo Milk: Soya Milk: Aspartame (85:10:5)

T<sub>2</sub>: Buffalo Milk: Soya Milk: Aspartame (80:13:7)

T<sub>3</sub>: Buffalo milk: Soya Milk: Aspartame (75:16:9)

### Sensory evaluation (9 point Hedonic scale)

The sensory quality of the control and experimental peda was evaluated by a panel of judges on a 9 point hedonic scale. The sample of peda was analyzed for sensory parameters like colour and appearance, flavour, body and texture and overall acceptability, whereas score of represented “dislike extremely” and score of a represented “like extremely”. The samples for evaluation were served to the judges for sensory evaluation (Amerine *et al.*, 1965) [11].

### Statistical Analysis

The data will be analyzed statically by WASP SOFTWARE and Analysis of variance at 5% level of significance ( $p < 0.05$ ).

### Result and Discussion

Data collected on the different aspects were tabulated and analyzed statistically using the method of analysis of variance and critical difference technique. The significant and non-significant differences observed have been analyzed critically within and between the treatment combinations of buffalo milk sugar free peda. The analyzed data is presented in this chapter in sensory attributes such as colour and appearance, flavour, body and texture and overall acceptability. De (1980) [6] reported physical quality of cow and buffalo khoa as colour straw/pale yellow with a tinge of brown in cow milk and whitish (light greenish white) with a tinge of brown in buffalo milk.

**Table 1:** Mean score of different treatments of control and different treatments of sugar free peda

Sensory attributes of sugar free peda						
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	F- value	C.D.
Colour and appearance	7.94±0.16	7.56±0.25	8.28±0.19	7.32±0.13	22.13*	0.28
Flavour and taste	7.90±0.20	7.49±0.27	8.52±0.22	7.63±0.24	15.05*	0.36
Body & Texture	8.22±0.39	7.90±0.37	8.42±0.17	7.52±0.25	9.98*	0.38
Overall acceptability	7.93±0.15	7.64±0.14	8.19±0.41	7.49±0.17	8.95*	0.32

\* Significant at 5 % level

### Colour and appearance score of sugar free peda

Table 1 indicates that colour and appearance score of sugar free peda sample of control and different treatments, the highest mean score of colour and appearance was recorded in sugar free peda sample of T<sub>2</sub> (8.28) followed by T<sub>0</sub> (7.94), T<sub>1</sub> (7.56) and T<sub>3</sub> (7.32). The differences in colour and appearance scores for sugar free peda made under various treatments were highly significant ( $P < 0.05$ ). The significant difference was also analyzed statistically to find out the C. D. between and within the different treatment combination of sugar free peda. The difference between the mean value of T<sub>0</sub>-T<sub>1</sub>(0.38), T<sub>0</sub>-T<sub>2</sub> (0.34), T<sub>0</sub>-T<sub>3</sub>(0.62), T<sub>1</sub>-T<sub>2</sub>(0.72) and T<sub>2</sub>-T<sub>3</sub>(0.96) was greater than the C.D. value (0.28). Therefore, the difference was significant. The difference between the mean value of T<sub>1</sub>-T<sub>3</sub> (0.24) was less the C.D. value (0.28) indicates non-significant ( $P > 0.05$ ).

### Flavour and taste score of sugar free peda

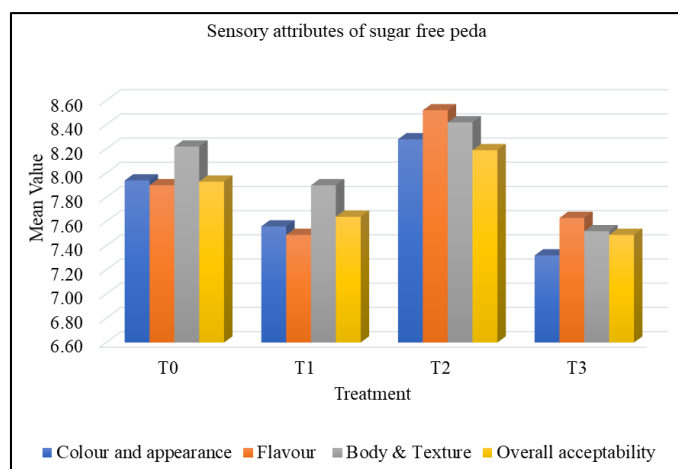
The flavour and taste score of sugar free Peda sample of different treatments, the highest mean flavour and taste scores was recorded in sample of T<sub>2</sub> (8.52) followed by T<sub>0</sub> (7.90), T<sub>3</sub> (7.63) and T<sub>1</sub> (7.49). The Significant difference was further analyzed statistically to find out the C. D. between and within the different treatment combination of samples. The difference between the mean value of T<sub>0</sub>-T<sub>1</sub> (0.41), T<sub>0</sub>-T<sub>2</sub>(0.62), T<sub>1</sub>-T<sub>2</sub>(1.03) and T<sub>2</sub>-T<sub>3</sub>(0.89) was greater than the C.D. value (0.36). Therefore, the difference was significant (P<0.05). The significance difference was observed due to the addition of different level of soya milk. The difference between the mean value of T<sub>0</sub>-T<sub>3</sub>(0.27) and T<sub>1</sub>-T<sub>3</sub> (0.14) was less than the C.D. value (0.36). Therefore, the difference was non-significant.

### Body and Texture score of sugar free peda

Body and texture score of sugar free Peda sample of different treatments, the highest mean body and texture scores was recorded in sugar free Peda sample of T<sub>2</sub> (8.42) followed by T<sub>0</sub> (8.22), T<sub>1</sub> (7.90) and T<sub>3</sub> (7.52). The Significant difference was further analyzed statistically to find out the C. D. between and within the different treatment combination. The difference between the mean value of T<sub>0</sub>-T<sub>3</sub>(0.70), T<sub>1</sub>-T<sub>2</sub>(0.52), T<sub>1</sub>-T<sub>3</sub>(0.38) and T<sub>2</sub>-T<sub>3</sub>(0.90) was greater than the C.D. value (0.38). Therefore, the difference was significant. The difference between the mean value of T<sub>0</sub>-T<sub>1</sub>(0.32) and T<sub>0</sub>-T<sub>2</sub>(0.20) was less than the C.D. value (0.38). Therefore, the difference was non-significant.

### Overall Acceptability score of sugar free peda

From the perusal of table 1, overall acceptability score of sugar free peda sample of different treatments, the highest mean overall acceptability scores was recorded in sugar free Peda sample of T<sub>2</sub> (8.19) followed by T<sub>0</sub> (7.93), T<sub>1</sub> (7.64) and T<sub>3</sub> (7.49). The significant difference thus obtained was further analyzed statistically to find out the C. D. between and within the different treatment combination. The difference between the mean value of T<sub>0</sub>-T<sub>2</sub>(0.26), T<sub>0</sub>-T<sub>3</sub>(0.44), T<sub>1</sub>-T<sub>2</sub>(0.55) and T<sub>2</sub>-T<sub>3</sub>(0.70) was greater than the C.D. value (0.32). Therefore, the difference was significant. The difference between the mean value of T<sub>0</sub>-T<sub>1</sub>(0.29) and T<sub>1</sub>-T<sub>3</sub> (0.16)) was less than the C.D. value (0.32). Therefore, the difference was non-significant.



**Fig 2:** Sensory Characteristics of sugar free peda manufactured from buffalo milk and soya milk

### Conclusion

Colour and appearance score in sample of control and different treatments, the highest mean was recorded in the sample of T<sub>2</sub> and lower was found in T<sub>3</sub> and the difference in these values of Colour & appearance all treatment were significant. Flavour score was recorded higher in the sample of T<sub>2</sub> and lower in sample T<sub>1</sub>. Similarly, body & texture score in sample of different and control, the highest mean was recorded in the sample of T<sub>2</sub> and lowest was T<sub>3</sub>. Overall acceptability mean score were recorded higher in the sample of T<sub>2</sub> and lower in sample T<sub>3</sub>. From the result it is concluded, that on the basis of organoleptic evaluation, T<sub>2</sub> (80:13:7) sugar free peda sample was optimised over the other sample under study. It can be also concluded that the soya milk and aspartame can be very well utilized for preparation of nutritious, palatable and low cost peda by blending 13 per cent soya milk and 7 aspartame with 80 per cent khoa on weight basis. Now a days sugar free peda is widely accepted of diabetic and non diabetic people.

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