

Study of Physiochemical, Sensory and Color Properties of Pinni Variants

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Abstract

Pinni is a milk based composite sweet having dark brown colour, granular in texture. The product is rich source of nutrients derived from milk solids as well as goodness of gram flour, wheat flour, dry fruits etc according to the variants. Pinni is one of the important composite dairy based sweets popular in northern part of India, particularly in Punjab and Haryana region despite the fact that it is a common and most popular traditional dairy product, scanty or no scientific information is available about it. Through present study an effort was made to know the average composition of different variants of pinni and also the extent of variation between samples the samples. The proximate analysis showed that the moisture content ranged between 2.6% to 5.2%, per cent fat between 28.5 to 39%. Highest protein content of 11.12% was found in Type III sample. The ash content showed very less variation for all variants. Type II sample scored highest sensory scores (7.62) for colour and appearance. Overall acceptability preference was given to Type I sample, with highest sensory scores for texture (7.25), sweetness (7.36), and flavor/taste (7.00).

Keywords: Color Analysis, Composite Dairy Product, Pinni, Sensory Analysis, Traditional Dairy Product

1. Introduction

In Indian food ethos, cereal, pulses and milk have been strongly engrained as staple foods. Traditional composite dairy products have several innovative blends of cereals and dairy products. A number of traditional food products characteristic of regions and even local pockets of the country are prepared from variety of raw materials. Each product has its distinctive taste as it evolved through the ages. A tradition bound country; India attaches great significance to festive occasion. Such celebrations are marked by distribution of cereal based milk sweets. Composite dairy foods are popular and having important position in Indian diet as well as a part of festive celebration. Amongst the various composite dairy foods like kheer, paysam, panjiri, pinni, etc., pinni is prominent one. It is a rich source of fat, protein, minerals and energy. Considering its high nutritive value, traditionally pinni is considered as an ideal food for young ones in their growing stage, pregnant and lactating women. Amongst the

many types of pinni available in the market dal pinni, atta pinni, and Gram Flour/Besan pinni are the major variants. Though these variants are common in northern India but its demand is growing in other parts of Indian also. Though exact data for the production and demand of pinni is not known however, broadly estimated market value for the traditional dairy products in India is around Rs. 50,000 crores annually¹.

Pinni is usually prepared in winter as a source of energy and is given to lactating mothers after child birth and also enjoyed by young ones and adults. Pinni is characterized by light brown colour with grainy texture and pleasant flavour coupled with good nutritive value. In older times production of pinni was confined to domestic level, but with urbanization now pinni is manufactured at small/cottage scale as well as by cooperatives in Punjab. Out of these Pinni is traditional sweet prepared by roasting cereals flour mainly wheat, or gram flour and used dal flour or dal paste with added khoa and sugar. There is great demand of pinni in other region of India due to its

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unique taste and health benefits. Despite the fact that it is a common and popular product very limited scientific information is available about average composition of its variants and product characteristics including sensory and physico-chemical properties.

It is important that its physio-chemical characterization is done on scientific basis. The scientific study will also help in developing suitable manufacturing and packaging system to facilitate its commercial manufacture. Efforts need to be made to provide standardized products through quality ingredients, recipes and improved production techniques. The present work is planned to study the variant of pinni on the basis of sensory evaluation performed by semi trained panel of the department. Cereal based milk products are popular all over India. Each region has its own distinctive product range in this category.

2. Materials and Methods

2.1 Materials Commercially Available

Wheat flour, semolina, ghee, khoa, almonds, cashew nut and refined sugar etc. were purchased from local market of Ludhiana. Khoa was prepared by desiccation of milk (3.5% fat and 8.5% SNF) in an open pan steam jacketed kettle at Experimental Dairy Plant of Institute (College of Dairy Science and Technology, Ludhiana)².

2.2 Preparation of Pinni

2.2.1 Method for Making Atta-Khoa Pinni Variant

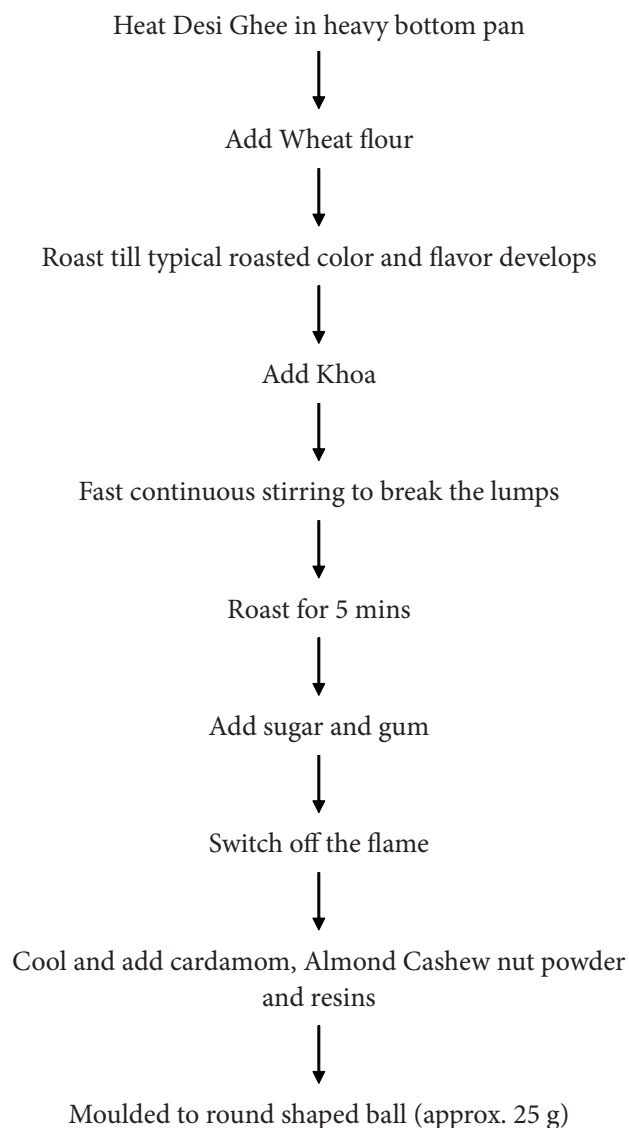
Atta-Khoa pinni Variant is the most common variant prepared in household as well as by small scale manufactures. For this, 100 gm of desi ghee was melted in heavy base Karahi (pan/wok). On heating up of ghee 100 gm wheat flour was added. Roasting of wheat flour was done on medium flame till typical roasted flavor and color developed. Khoa (100 gm) was added with continuous stirring to break Khoa lumps into small granules. Roasting was continued for another 5 mins and after that 10 gm gum and 60 gm sugar was added and stirred to properly mix the ingredients. After this stage heating was discontinued and almond (10 gm), cashew nut (10 gm) and cardamom powder (3 gm) along with resins (10 gm) was added and mixed properly. The mixture was allowed to cool and then manually moulded into shape of ball 45 gm approximately.

The methodology followed and steps involved in pinni making remained the same and are described here the ingredients i.e., cereals added different in each variant are given below

2.2.2 Composition of Wheat Flour/Atta Pinni

Desi Ghee	100 gm
Wheat flour	100 gm
Khoa	100 gm
Sugar	60 gm
Almond powder	10 gm
Cashew powder	10 gm
Resins/Gum	10 gm (each)
Cardamom powder	3 gm

2.2.3 Flow Chart for Wheat Flour/Pinni



2.2.4 Recipe of Pinni Variants

For preparation of Pinni Variants 5 different types of composition were considered with respect to addition of cereals. Whereas, following types give the information of cereals added and its proportion. Methodology for preparation remained same as shown in flowchart above.

- Type I → Wheat Flour/Atta (100 gm)
- Type II → Wheat Flour/Atta (70 gm) + Semolina (30 gm)
- Type III → Gram Flour/Besan (100 gm)
- Type IV → Gram Flour/Besan (70 gm) + Semolina (30 gm)
- Type V → Wheat Flour/Atta(50gm) + Gram Flour/Besan(25 gm) + Semolina(25 gm)

Rest all ingredients i.e. ghee, khoa, resins, nuts and sugar remained same.

2.3 Proximate Analysis of Pinni

2.3.1 Moisture

Pinni samples (5 gm) each was dried in a clean, dry and pre-weighed moisture dish and kept in with lid open at 100-105°C for 16-18 hr in hot air oven. After cooling in desiccator, loss in weight was calculated as moisture of sample and expressed as per cent moisture.

Moisture%

$$= \frac{\text{Weight Of Fresh Sample (G)} - \text{Weight Of Dried Sample}}{\text{Weight Of Fresh Sample (G)}} \times 100$$

2.3.2 Protein

Macro Kjeldhal method was used for determination of protein³. Pinni sample (1 gm) was weighed and digested in Kjeldhal flask with digestion mixture (copper sulphate and potassium sulphate in 1:5 ratio and conc. H₂SO₄ (20 ml) till tight green clear liquid appear and cooled. An aliquot of digest was distilled with 50% NaOH and liberated ammonia was collected in 10 ml saturated boric acid containing 2-3 drops of mixed indicator. The collected distillate is titrated again 0.1 N HCl. The per cent present protein was calculated as:

$$\% \text{ protein} = \% \text{ N}_2 \times 6.25$$

2.3.3 Fat

Fat was determined with the help of Monjonner fat extraction apparatus as specified in Indian standard (1967).

Five gram of sample was made to paste with equal amount of warm distilled water in Monjonner tubes. Two ml of conc. NH₃ solution and 9 ml distilled water were added. Then swirled gently and cooled, then 10 ml ethyl alcohol was added. Twenty five ml of each diethyl ethanol and petroleum ethanol were added and tubes were closed with wet cork and shaken vigorously for 1 min. Tubes were left undisturbed for half an hour & the supernatant liquid was decanted in clean dry previously weighed aluminum dish. Extractions were repeated twice using 15 ml diethyl and petroleum ethanol each time. The dishes were heated in oven at 98-100°C cooled and weighed till weighing did not show and loss in weight by more than 1 mg. Percent fat is calculated as:

$$\% \text{ Fat} = \frac{\text{Weight of fat (g)}}{\text{Weight of sampel (g)}} \times 100$$

2.3.4 Ash

Ash content was determined by placing the charred pinni samples in silica crucibles and heated in muffle furnace at 525°C for 6 hr until white color ash was obtained to a constant weight.

$$\% \text{ Ash} = \frac{\text{Weight of ash (g)}}{\text{Weight of sample (g)}} \times 100$$

2.4 Color Analysis

Color of pinni was analyzed by Hunter Lab Colorimeter, model DP-9000 D25 A (Hunter associates laboratory, Reston, VA, USA). The colorimeter was calibrated using a standard white and black plate. Here color values 'L', 'a', 'b' were measured. The dimension 'L' indicate lightness, with 100 for white, 0 for black; 'a' indicate redness when positive and greenness when negative, 'b' indicate yellowness when positive and blueness when negative⁴.

2.5 Sensory Evaluation

The Pinni was organoleptically evaluated on the day of preparation. An eight member semi-trained sensory panel was selected from the faculty member of college of Dairy Science and Technology, GADVASU, Ludhiana. Nine point hedonic scale was used for evaluation of Pinni for color, appearance, texture, sweetness and over all acceptability⁵. Different types of sample were coded with specific code and then panelists were instructed to evaluate the

samples for sensory attributes as mentioned above. Water was provided to the panelists to cleanse their palates in between every sample. The average scores indicated in the table (rounded to the nearest whole number) were based on a single evaluation of each of the 10 individuals. Ten trained panelists evaluated the bread for each parameter as: 9-extremely like, 8-like very much, 7-like moderately, 6-like slightly, 5-Neither like nor dislike, 4-dislike slightly, 3-dislike moderately, 2-dislike very much, 1-extremely dislike⁶.

2.6 Statistical Analysis

The data on the proximate composition and organoleptic scores of pinni were statistically analyzed and subjected to analysis of variance using Completely Randomized Design (CRD) using the software CPCS-1⁷. Each value given is mean of three observations⁸.

2.7 Result and Discussion

2.7.1 Proximate Analysis

All the five samples of pinni varied significantly for proximate analysis i.e., fat, moisture, protein and ash. The moisture content varied significantly ($p < 0.05$) for all the five sample with maximum per cent (5.2%) for pinni prepared from Wheat Flour/Atta (Type I) only and minimum (2.6%) for pinni prepared from Wheat Flour/Atta suji and Gram Flour/Besan suji (Type II) (Tables 1). The probable reason for wider variation in moisture content of samples could be due to Gram Flour/Besan which have

lesser moisture content as compared to wheat flour. There was significant ($P < 0.05$) difference in the fat content of samples (Tables 1). Pinni prepared from the mixture of all the components (Type V) had highest fat per cent (39%) and lowest per cent (28.5%) in pinni prepared from Wheat Flour/Atta only (Type I). Optimum fat content is essential for sensorily good quality of products. Higher fat content may lead to greasy texture while very low fat content may results into gritty or hard texture of pinni. Besides fat, protein is another important constituent of pinni, which improves its nutritional profile. The maximum protein content (11.12%) was found in pinni prepared from Gram Flour/Besan only (Type III) and minimum (8.54%) was found in pinni prepared by mixture of all the five components (Type V). the reason behind this is that Gram Flour/Besan has highest protein content. Though the ash content varied significantly between the samples yet the per cent ash content was 1% for Type I, II and Type V. for Type III and Type IV per cent ash content was 1.5%. Besides ingredients which is the principle source of mineral content into pinni, heating/frying kettle which usually consist of cast iron is another factor from where iron gets leached out and added into product during manufacturing process i.e., continuous heating, stirring and scraping for prolonged period².

2.7.2 Sensory Analysis

Pinni is characterized by brown color with grainy texture and pleasant nutty flavor. The average sensory scores for all the sensory attributes were shown in Table 2.

Table 1. Approximate analysis of all variants of pinni

Parameters	Wheat Flour/Atta (Type I)	Wheat Flour/Atta Suji (Type II)	Gram Flour/Besan (Type III)	Gram Flour/Besan Suji (Type IV)	Mix (Type V)	CD ($p \leq 0.05$)
Moisture (%)	5.2	2.6	4.2	2.6	2.4	0.363
Protein (%)	8.57	9.15	11.12	10.09	8.54	0.193
Fat (%)	28.5	30	35.5	37	39	2.666
Ash (%)	1	1	1.5	1.5	1	0.205

Table 2. Sensory Attributes

Parameters	Wheat Flour/ Atta (Type I)	Wheat Flour/Atta Suji (Type II)	Gram Flour/Besan (Type III)	Gram Flour/Besan Suji (Type IV)	Mix (Type V)	CD ($p \leq 0.05$)
Color & appearance	7.00	7.62	6.87	6.93	6.10	NS
Texture	7.25	6.62	7.10	6.52	6.75	NS
Sweetness	7.36	7.36	6.87	6.62	7.18	NS
Flavor / Taste	7.00	6.56	6.87	6.24	5.68	NS
Overall acceptability	7.10	7.09	6.92	6.57	6.42	NS

During the sensory analysis all the attributes varied non-significantly between the samples. Sample Type II was most appreciated sample by sensory panelists for its color and appearance scores (7.62) which was closely followed by sample Type I (7.0) and Type IV (6.93). Texture is one of the most important sensory parameter for any food product including pinni. The average texture scores of all five samples ranged between 7.25 for Type I (highest) and 6.52 for Type III (lowest). The lowest texture score for sample Type IV may be due to low moisture content as Gram Flour/Besan is dry in nature. The average sweetness scores varied from 7.36 to 6.62 (Table 2). Sample Type I and II was most appreciated samples for its sweetness score by sensory panelist followed by sample Type V. Like any other food product, in pinni also flavor is one of the most important sensory parameters which effects the overall acceptability of the product. The average flavor score was maximum for sample Type I (7.00) and minimum for sample Type IV (5.68). Overall acceptability score was highest for sample Type I (7.10), followed by sample Type II (7.09) and least preferred sample was Type V (6.42).

2.7.3 Color

Color is an important attribute for pinni as color is perceived by consumers to be related to its good roasting and richness of the product. Instrumental color value of pinni measured in terms of L^* , a^* , b^* values using Hunter Lab Colorimeter were shown in Table 3. The L^* which represents lightness varied between 38.10–50.98, while a^* indicating redness varied between 9.54–11.23, while b^* indicating yellowness varied between 21.22–35.14 (Table 3). The L^* value was maximum for sample Type III, followed by Type IV and minimum for sample Type II. This indicated the brightness sample Type III was higher than all other samples. But the darkest sample Type II was

preferred by sensory panelist for color and appearance attribute as it gave feel of well roasted product. Recorded values for a^* (Redness) were maximum for sample Type IV (12.43) and minimum for sample Type (9.54). The b^* (Yellowness) value was maximum for sample Type III (35.14) and minimum for sample Type I. Maillard browning is characterized by two primary hues viz., red and yellow. The browning of pinni was due to combination of redness (positivity value of a^*) and yellowness (positive b^*)⁹.

3. Conclusion

Composite dairy foods are popular and occupy an important position in Indian diet. Amongst the various composite food like kheer, paysam, panjiri etc, pinni is important one. Pinni is most important composite traditional dairy based sweet popular in northern parts of India, particularly Punjab and Haryana region. Though pinni is prominent composite dairy product but study regarding its variants and its physiochemical properties is not available. In this five variants of pinni were studied with respect to variation in cereal addition and its effect on sensory scores, physio chemical properties and color. It was evident from the sensory scores that Type I, Wheat Flour/Atta pinni was most preferred among all the variants though it had highest moisture content (52%) and lowest (28.5%). Protein content was maximum in Type III, Gram Flour/Besan pinni. None of the variant scored below 6.5, no sample was disliked by the panel. This study and information derived will help small stakeholder for standardize their methodology for a uniform product.

4. Acknowledgement

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Table 3. Color

S.No	Sample name	L^*	a^*	b^*
1	Wheat Flour/Atta pinni	41.89	9.54	21.22
2	Wheat Flour/Atta semolina	38.10	9.98	20.89
3	Gram Flour/Besan	50.98	11.34	35.14
4	Gram Flour/Besan semolina	49.53	12.43	33.02
5	Mix	47.94	10.23	26.83

L^* , a^* , b^* values are average values.

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