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Studies of ashwagandha and brahmi effect on chemical properties of herbal based prepared peda

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Abstract
Khoa is a condensed milk product that has been heat-denatured and is used to make khoa-based desserts including gulabjamun, burfi, and peda. Peda is a product made by mixing sugar with khoa, or partially dehydrated milk. Peda is more granular, has a firmer texture, and has a longer keeping quality than burfi. The manner of preparation is determined by regional preferences for quality, which has a significant impact on the sensory and chemical characteristics of the final product. Some people favour the white peda colour, while others request the brownish colour. Halwais have mastered the art of making sweets from leftover milk for economic reasons in order to satisfy local demand. The chemical make-up, flavour, and textural characteristics of items vary greatly. The product's microbiological quality is likewise subpar. Many of these items would require the adoption of sanitary precautions at all levels of handling due to the presence of numerous unwanted microorganisms, such as enterotoxin-producing staphylococci and preformed heat stable toxins. With a percentage increase in the amount of ashwagandha and brahmi powder, the moisture content of peda in the treated samples exhibited a trend toward decreasing. Peda with 2, 4, and 6% ashwagandha and brahmi powder had significantly lower fat content than the control. The fat content of the peda containing ashwagandha and brahmi powder significantly decreased as the amount of ashwagandha and brahmi powder was increased. Ashwagandha and brahmi powder considerably reduced the percentage of protein in peda when compared to the control. Because of the addition of ashwagandha and brahmi powder at 2, 4, and 6%, the sugar content of peda significantly increased.

Keywords: Protein %, ash, fat, moisture% and total carbohydrate

Introduction
Khoa is traditional indigenous product. It is known by different name like khoya, khava, kava, khawa, palghoa or mawa. According to (FSSR 2011), khoa is defined as "the product obtained from cow, buffalo, goat, sheep, or milk solids or a mix thereof by rapid drying." It is offered under a variety of names, including "Pindi," "Danedar," "Dhap," "Mawa," and "Kava." On a dry weight basis, the milk fat content must be at least 30% of the final product. Khoa contains significant amounts of fat-soluble vitamins, minerals, lipids, proteins, and lactose. The product's value is increased by further using khoa as the primary raw material in the production of peda and kalakand. All around the nation, peda, kalakand, and other sweets made with khoa are prepared. These are made by combining khoa with roughly 30% sugar, which has a preservation effect and an extended shelf life. Like Sandesh in the east, Peda is well-liked in the north. The best peda originates in Mathura's Brindavan region (Aneja *et al*., 2002) [22].

Obesity, diabetes, and cardiovascular illnesses have become serious health problems as a result of changing lifestyles in affluent and technologically advanced societies. One of the six nations in the IDF's South East Asia zone is India. By 2045, there will be 151 million people with diabetes worldwide, including 82 million in the SEA Region. In India, there were around 72.946.400 diabetes cases in 2017. (IDF, 2017). The creation of low-calorie foods and dairy products for the poor diabetic and CVD patients is urgently needed. Several low-calorie dairy products are already on the market, but the demand for these goods is still unestablished due to the myth of negative effects.

FOS is regarded as a food ingredient that promotes health, and many researchers are already aware of the use of these compounds in the production of food products. FOS are practical and desirable by products for various food applications because to their variety of chemical and structural confirmation characteristics (Borromei, 2009) [23].

Due to their prebiotic action, FOS is currently being added to more and more foods and infant formulas. This impact encourages the formation of non-pathogenic intestinal microbiota. People now have an interest in low-calorie foods. However, fat is crucial in giving the product its distinctive flavour, colour, and texture. Due to increased consumer awareness of the negative effects of fat on their health, low-fat dairy products with functional ingredients like fibre content are becoming more and more popular.

Materials and Methods

Ashwagandha powder and Brahmi powder were procured from local market and used for the preparation of herbal peda by adopting standard procedure and different physical qualities such as flavour, body and texture, colour and appearances, overall acceptability and chemical qualities such as moisture, fat, protein, total carbohydrate and ash in percent age were determined by following the standard procedure.

Determination of moisture

Moisture content of peda samples were determined by procedure described by ISI: 2785 (1964) [11].

Determination of fat

Fat content of peda was determined by Gerber's method as described in IS-1224 (Part- II-1977) [9] for analysis of cheese.

Determination of protein

Protein content of peda was determined by Micro Kjeldhl's method as per Meneffee and Overman (1940) [25]. The protein content was obtained by multiplying percent nitrogen of sample by factor of 6.38. Percentage of protein in the sample was calculated with the help of following formula.

Determination of total carbohydrate content

Total carbohydrate content of peda samples were determined by the volumetric (lane-Eynon) method as a described in ISI (1981) [8]. Standardized the Fehling's solution with 0.5% pure lactose solution and from the volume of 0.5% lactose solution used, calculated the factor for 10ml of Fehling's solution. Usually it was found that 10ml Fehling's solution (5 ml Fehling's A + 5 ml Fehling's B = 0.0678 g factors). The percentage of lactose in peda was calculated with the help of formula given below:

Determination of ash

Ash content of *peda* was determined using method A.O.A.C (1975) [1].

Results and discussion

Moisture content

The mean values for percent moisture content of control peda and peda with ashwagandha and brahmi powder @2, 4 and 6 percent are presented in Table 1. Moisture content of control peda18.30 percent) was significantly higher than Peda with ashwagandha and brahmi powder A2, A4, A6, B2, B4 and B6 (17.60, 16.60, 16.40, 17.70, 16.40 and 16.30 percent, at 2, 4 and 6 percent of ashwagandha and brahmi respectively). Among the treatments values decreased significantly as the level of ashwagandha and brahmi powder increased from 2 to 6 percent respectively. The critical differences (CD) was calculated and treatment differences were tested at 5% level of significance. The moisture content was the highest in control (18.30 percent) and the lowest in brahmi at 6 percent (16.30 percent). All treatment was significantly differed from each other. Lower moisture content in peda with ashwagandha and brahmi powder could be due to less moisture content in ashwagandha and brahmi powder *i.e.* 16.30 percent. Nawadkar (2017) [18] analyzed chemical composition of Parbhani local peda, Gangakhed kalam and Kuntalgiri peda and observed that average moisture content in Parbhani local market peda, Gangakhed kalam and Kuntalgiri peda was 18.02, 14.10 and 12.32 percent respectively. Ray *et al.* (2012) [24] carried out comparative studies on quality of market and laboratory made peda. They found that the moisture content in market and laboratory madepeda samples ranged from 14.73±2.45 and 14.65±1.03 respectively. Narwade (2003) [17] analyzed famous brand of peda in Maharashtra state for chemical composition. He observed that the moisture content of peda ranged from 12.50 to 19.00 percent Patel (2006) [19] conducted the studies on traditional and mechanized method of peda making. He reported traditionally made peda contained 13 percent moisture.

Table 1: Moisture content of peda with ashwagandha and brahmi

Treatment	Replication			Mean
T_0	18.23	18.34	18.38	18.3[a]
A_2	17.45	17.53	17.89	17.6[b]
A_4	16.54	16.58	16.53	16.6[c]
A_6	16.83	16.12	16.26	16.4[d]
B_2	17.66	17.56	17.76	17.7[e]
B_4	16.12	16.75	16.45	16.4[f]
B_6	16.19	16.11	16.55	16.3[g]

Fat content

The mean values for percent fat content of control peda (T_o) and peda with ashwagandha and brahmi powder 2, 4 and 6 percent (A_2, A_4, A_6, B_2, B_4 and B_6) are presented in Table 2. The fat content of control peda (T_0) and peda with ashwagandha and brahmi powder (A_2, A_4, A_6, B_2, B_4 and B_6) was 18.50, 17.30, 17.8, 16.80, 17.40, 16.40 and 16.70 respectively. The fat content in the formulated products ranged between 16.40 to 18.50 percent. The highest fat content was recorded for treatment T_0 (18.50 percent) while lowest fat content was recorded for treatment B_6 (16.40 percent). There were significant differences between the fat content of treatment (T_0) and the rest of treatments. Treatment T_0 was found to be significantly superior over treatment A_2, A_4, A_6, B_2, B_4 and B_6. The fat content in the finished product was decreased due to the less amount of fat in ashwagandha and brahmi powder i.e. 11.35 percent. The results showed that fat content of control peda was significantly higher than peda with ashwagandha and brahmi powder. The values recorded for fat content in the present investigation were comparable with below mentioned research workers. Mane (1994) [15] reported the fat content in laboratory made peda as 18.33 percent. Patel (2006) [19] reported 18.4 percent fat in traditionally made 30peda. Jadhav (2004) [13] analyzed chemical composition of kandi peda. He observed that the fat content of kandi peda was 17.84 percent. Gotarne (2020) [5] analysed chemical composition of laboratory made sample of brown peda. He reported that the fat content of brown peda as 20 percent.

Table: 2 Fat content of peda with ashwagandha and brahmi

Treatment	Replication			Mean
T_0	18.23	18.56	18.76	18.5[a]
A_2	17.56	17.25	17.12	17.3[b]
A_4	17.76	17.66	17.83	17.8[c]
A_6	16.87	16.43	16.99	16.8[d]
B_2	17.45	17.61	17.15	17.4[e]
B_4	16.11	16.34	16.65	16.4[f]
B_6	16.89	16.87	16.19	16.7[g]

Protein content

The results regarding percent protein content of control peda (T_0) and peda with ashwagandha and brahmi powder 2, 4 and 6 percent (A_2, A_4, A_6, B_2, B_4 and B_6) are presented in Table 3. Protein content of control peda (T_0) and peda with ashwagandha and brahmi powder (A_2, A_4, A_6, B_2, B_4 and B_6) were 14.6, 14.2, 13.4, 13.5, 14.3, 13.2 and 13.8 percent, respectively. The results showed that protein content of control peda was significantly superior over peda sample with 2, 4 and 6 percent ashwagandha and brahmi powder. Among the treated samples protein content decreased significantly as the percent level of added ashwagandha and brahmi powder increased from 2 to 6 percent. This might be due to the low protein content (9.58 percent) in ashwagandha and brahmi powder than buffalo milk khoa.

Table 3: Protein content of peda with ashwagandha and brahmi

Treatment	Replication			Mean
T_0	14.66	14.90	14.29	14.6[a]
A_2	14.45	14.11	14.18	14.2[b]
A_4	13.24	13.57	13.49	13.4[c]
A_6	13.87	13.39	13.38	13.5[d]
B_2	14.56	13.91	14.29	14.3[e]
B_4	13.12	13.27	13.19	13.2[f]
B_6	13.76	13.88	13.81	13.8[g]

Total Carbohydrates content

The results related to total carbohydrate content of control peda (T_0) and peda with ashwagandha and brahmi powder powder 2, 4 and 6 percent (A_2, A_4, A_6, B_2, B_4 and B_6) are presented in Table 4. Total carbohydrate content of control peda (T_0) and peda samples with ashwagandha and brahmi powder (A_2, A_4, A_6, B_2, B_4 and B_6) ranged from 45.3, 46.5, 47.7, 48.5, 46.7, 47.3 and 48.4 percent, respectively. Significant increase in total carbohydrate content was observed in treated samples as compared to control. Among the treated samples percent total carbohydrate content increased significantly as the percent addition of ginger powder in peda increased from 2 to 6 percent. Increase in carbohydrate content of peda with ashwagandha and brahmi powder was due to high carbohydrate content (48.4 percent) in ashwagandha and brahmi powder. Ghorpade *et al.* (2014) [3] analysed chemical composition of laboratory made kalam. They observed that the carbohydrate content in laboratory made kalam was 44.10 percent. Nawadkar (2007) [18] reported chemical composition of Gangakhed kalam peda and observed that the carbohydrate content of peda was 46.55 percent. Pawar (2008) [2] observed carbohydrate content of plain *peda* from standardized buffalo milk khoa (6 percent) was 45.50 percent. Gotame (2011) [4] analyzed chemical composition of laboratory made sample of brown peda and reported the carbohydrate content of brown peda was 46.50 percent.

Table 4: Total carbohydrate content of peda with ashwagandha and brahmi

Treatment	Replication			Mean
T_0	45.34	45.33	45.29	45.3[a]
A_2	46.67	46.51	46.31	46.5[b]
A_4	47.86	47.81	47.56	47.7[c]
A_6	48.12	48.61	48.73	48.5[d]
B_2	46.59	46.84	46.54	46.7[e]
B_4	47.19	47.64	47.18	47.3[f]
B_6	48.29	48.71	48.33	48.4[g]

Ash content

The values for ash content of control peda (T_0) and peda with ashwagandha and brahmi powder 2, 4 and 6 percent (A_2, A_4, A_6, B_2, B_4 and B_6) are presented in Table 5. Ash content of control peda (T_0) and peda samples with ashwagandha and brahmi powder (A_2, A_4, A_6, B_2, B_4 and B_6) were 3.4, 2.8, 3.3, 3.6, 2.7, 3.6 and 3.8 percent, respectively. The treatment T_3 and T_2 as well as treatment T_2 and T_1 were at par with each other. There was significant difference observed in between the treatment T_0 and treatment A_3. The ash content of B_6 was significantly lower than the treated samples (A_2, A_4, A_6, B_2, B_4 and B_6), as the percent addition of ashwagandha and brahmi powder increased, there was significant increase in ash content. This might be due to addition of ashwagandha and brahmi powder as it contains (3.80) percent ash. Yadav *et al.* (1993) [21] reported ash content of laboratory made peda as 2.0 percent. Dharm pal (1997) [2] reported that the ash content of peda ranged from 1.40 to 3.40 percent. Ghorpade (2004) [3] analyzed chemical composition of laboratory made kalam. He observed that ash content in laboratory made kalam was 2.30 percent. Jadhav (2004) [13] analyzed chemical composition of kandi *peda* and reported that the ash content of kandi peda as 2.05 percent. Patel *et al.* (2016) [19] reported ash content in traditionally made peda was
2.4 percent. Jadhav (2010) [12] analyzed chemical composition of plain peda samples collected from different market of Latur district and he reported the ash content which was ranged between 1.65 to 2.27 percent.

Table 5: Ash content of peda with ashwagandha and brahmi

Treatment	Replication			Mean
T_0	3.2	3.3	3.6	3.4[a]
A_2	2.7	2.8	2.9	2.8[b]
A_4	3.3	3.4	3.1	3.3[c]
A_6	3.8	3.6	3.5	3.6[d]
B_2	2.6	2.7	2.9	2.7[e]
B_4	3.3	3.8	3.6	3.6[f]
B_6	3.9	3.8	3.7	3.8[g]

Conclusion

Based up on the use of different concentration of herbal powder it can be concluded that Brahmi at 6 percent exhibit better chemical properties and there is significant improvement in chemical properties *viz.*, Ash, fat, protein content and moisture percentage. Microbiolical quality standard plate count also shown to be improved.

Future scope

As there is need to increase the income of farmer, preparation of dehydrated dairy product provide ample opportunity to prepare the different herbal derived peda with adequate improvement in chemical properties. So there is need to

standardize the different herbal product with desirable content.

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