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Effect of different levels of beetroot (*Beta vulgaris*) on chemical composition of Burfi prepared from Cow milk

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Abstract

The present investigation was carried out in the Laboratories of Department of Animal Husbandry and Dairy Science, Dr. PDKV, Akola during the year 2020-2021. Burfi was prepared with different combinations of cow milk khoa and beetroot pulp as 100:00 (T₁), 97:03 (T₂), 94:06 (T₃), 91:09 (T₄) and 88:12 (T₅) and the samples were subjected to find out the effect of different levels of beetroot pulp on chemical composition of burfi. These ingredient of burfi i.e. khoa was prepared from cow milk and another hand beetroot pulp was prepared. The beetroot pulp was mixed with khoa at dough stage. Then at proportion cane sugar was added @ 30% and mixed properly.

In reference to chemical analysis it was found that, fat content was 19.60, 19.01, 18.43, 17.85 and 17.27 per cent., protein content of beetroot pulp burfi was 14.90, 14.48, 14.08, 13.68 and 13.28 per cent., total sugar content was 48.08, 44.67, 43.59, 42.51 and 41.41 per cent., Ash content was 2.70, 2.64, 2.59, 2.54 and 2.49 per cent., total solid content was 85.25, 80.80, 78.74, 76.61 and 73.31 per cent., moisture content was 14.75, 19.20, 21.26, 23.39 and 26.29 per cent for treatment (T₁), (T₂), (T₃), (T₄) and (T₅), respectively. In short fat, protein, total sugar, ash and total solids content in Burfi were decreased while, moisture were increased with increase in level of beetroot pulp in Burfi.

Keywords: Cow milk Khoa, Burfi, Beetroot pulp, Chemical composition

Introduction

Burfi sold commercially varies widely in colour, body, texture, sweetness and flavour characteristics (Sarkar *et al.* 2002) [14]. Variations in ingredients, their proportions and processing conditions affect the quality of Burfi and lack of knowledge in these aspects is a serious limitation for the process standardization and quality control. Although the Bureau of Indian Standards has laid down a standard for chemical and microbiological quality of milk Burfi (BIS 1980) [3], there is a need for generating data on optimizing processing and quality of milk Burfi. Burfi has been flavoured as one of the most popular Khoa based sweet all over India. Now-a-day local producers are using orange, mango, coconut, potato, etc. in preparation of Burfi (Kamble *et al.* 2010) [10]. Beetroot (*Beta vulgaris*) consists of vitamin A, thiamine, riboflavin, niacin, vitamin C, folate, vitamin B₆ and pantothenic acid are also present in small amounts. It also constituents traces of beta carotene. Beet is known for being rich nutrients and low in calorie, having a calorific value of 43.0 per 100 gm. (Kapadia *et al.*,1996) [11]. Hence in the present investigation the efforts were taken to find out the effect of different levels beetroot pulp on chemical composition of Burfi prepared from cow milk khoa.

Material and Methods

Preparation of Burfi

Fresh, clean, cow milk was procured from Livestock Instructional Farm Department of Animal Husbandry and Dairy Science, Dr. PDKV, Akola. Milk was standardized at 4 per cent fat and 9 per cent SNF. Clean crystalline cane sugar was purchased from local market was used as sweetening agent @ 30% for the preparation of beetroot pulp burfi. Fresh succulent and good quality beetroot was purchased from local market of Akola and used for the preparation of beetroot pulp burfi. Burfi was prepared with slight modification in the procedure given by Aneja *et al.* (2002) [2]. Burfi was prepared with different combinations of cow milk khoa and beetroot pulp as 100:00 (T₁), 97:03 (T₂), 94:06 (T₃), 91:09 (T₄) and 88:12 (T₅) with 04 replications.

Chemical analysis of Burfi

The fat content of burfi was determined by Gerber's method as described in IS: 1224 (part II) 1977. The protein content of burfi blended with beetroot pulp burfi was determined by the Microkjeldahl's method as described in IS: 1981 [8]. The total sugar was estimated by the spectrophotometer method. The total ash content of burfi sample was determined by method given by IS: 1981 [8]. Total solids of burfi were determined by the method described in IS: 1479 [7] (Part-II) 1961. Moisture content in the sample was determined by subtracting the total solids content from 100 in the sample. The data was tabulated and analyzed by employing Completely Randomized Design (CRD) using seven treatments with four replications as prescribed by Sheoran *et al.* (1998) [15].

Results and Discussion

Chemical composition of beetroot pulp burfi

Effect of different levels of beetroot pulp on chemical composition of burfi prepared from cow milk khoa was determined in the laboratory as per prescribed methods and the data obtained was statistically analyzed, tabulated and presented in Table 1.

Table 1: Effect of different levels of Beetroot pulp on chemical composition of burfi prepared from cow milk khoa (per cent).

Treatments	Parameters					
	Fat	Protein	Total sugar	Ash	Total solids	Moisture
T ₁	19.60	14.90	48.08	2.70	85.25	14.75
T ₂	19.01	14.48	44.67	2.64	80.80	19.20
T ₃	18.43	14.08	43.59	2.59	78.74	21.26
T ₄	17.85	13.68	42.51	2.54	76.61	23.39
T ₅	17.27	13.28	41.41	2.49	73.31	26.29
S.E(m)±	0.060	0.101	0.0633	0.067	0.0880	0.0702
C.D. at 5%	0.181	0.306	0.1910	NS	0.2652	0.2118

Effect on Fat content of Burfi: It seems from table 1 that, the average fat content in the burfi was significantly varies due to addition of beetroot pulp. The fat content of burfi prepared under the treatment (T₁), (T₂), (T₃), (T₄), and (T₅) by utilization of beetroot pulp were 19.60, 19.01, 18.43, 17.85 and 17.27 per cent, respectively. The fat content in treatment (T₁) was highest (19.60%) among all the treatments. The lowest fat content (17.27%) was observed in burfi prepared with addition of 12 parts of beetroot pulp and 88 parts of khoa (T₅). The present findings are in agreement with the Chaudhari (2015) [4] observed that as increases in carrot pulp level, there was decreased in the fat content from (19.73 to 15.31%) of burfi, this might be due to low fat content in carrot pulp. Similarly, finding of Tanuja *et al.* (2017) [16] who noted that, Apple pomace levels, there was proportionately decreases (24.65 to 17.44%) in the fat content of burfi. Bankar *et al.* (2013) [2] conducted study on preparation of burfi blended with pineapple pulp observed as the level of pulp increased the fat content decline from (22.11 to 18.37%). These findings are agreeable with the findings of present study.

Effect on Protein content of Burfi: It observed from table 1 that, the average protein content in the burfi was significantly Varies due to addition of beetroot pulp. The protein content in treatment (T₁) was highest (14.90%) among all the treatments. The lowest protein content (13.28%) (T₅) was observed in burfi prepared with addition of 12 parts of beetroot pulp.

The decreasing trend of protein content in burfi prepared with beetroot pulp was noticed with the increasing levels of beetroot pulp. These might be due to low protein content in beetroot pulp and higher fibre content. More or less similar results were found by Kadam *et al.* (2017) [9] reported that as the increase in the levels of Alphonso mango pulp, there was decrease in level of protein content in burfi from (10.41 to 9.58%). Ramteke *et al.* (2018) [13] also reported that as the levels of Potato flour increases, there was decrease (18.79 to 16.23%) in the level of protein content in burfi.

Effect on Total sugar content of Burfi: It is inferred from table 1 that, the addition of beetroot pulp in preparation of burfi significantly changed the total sugar content. The average value of total sugar content in burfi prepared with added beetroot pulp under treatments of (T₁), (T₂), (T₃), (T₄), and (T₅) were 48.08, 44.67, 43.59, 42.51 and 41.41 per cent, respectively. Significantly highest total sugar was noticed in (T₁) 48.08%. It was clearly indicated that as the beetroot pulp level increased, in preparation of burfi, the total sugar content in burfi also decreased. This might be due to low sugar content was found in beetroot pulp. More or less similar result were reported by Patil *et al.* (2017) [12] that as the levels of wood apple pulp increased there was increase in the levels of sugar content in burfi from (44.23 to 49.29%). However Bankar *et al.* (2013) [2] also reported that, is the levels of pineapple pulp increased; there was increase in the levels of total sugar content in burfi from (43.39 to 47.21%).

Effect on Ash content of Burfi: It is revealed from table 1 that, the average value of ash content in burfi blended with beetroot pulp under the treatment (T₁), (T₂), (T₃), (T₄), and (T₅) were 2.70, 2.64, 2.59, 2.54 and 2.49 per cent respectively, Significantly highest ash content was noticed in (T₁) 2.70. It is indicated that as the beetroot pulp level increased for preparation of burfi the ash content of burfi also reduced. This might be due to the low content of ash in beetroot pulp burfi. The results of present study are in agreement with Kapila Kamble *et al.* (2010) [10] while studied on preparation of pine apple pulp burfi reported 3.02 to 2.50 per cent ash content. Ramteke *et al.* (2018) [13] also reported that as the increase in the levels of Potato flour in the preparation of burfi, there was decrease in the level of ash content in burfi form (3.13 to 3.03%).

Effect on Total solids content of Burfi: It is observed from table 1 that, the addition of beetroot pulp in the preparation of burfi significantly changes the total solids content. The average values of total solids content in burfi prepared under the different treatment (T₁), (T₂), (T₃), (T₄) and (T₅) were 85.25, 80.80, 78.74, 76.61 and 73.31 per cent, respectively. It is observed highest total solids content in (T₁) 85.25. This indicated that as the beetroot pulp level increased, the total solids content in burfi also decreased. Moreover Patil (2017) [12] reported that with the increase in the levels of Wood apple pulp, there was decrease in the level of total solid content in burfi (82.44 to 79.92%).

Effect on Moisture content of Burfi: It is noticed from table 1 that, the average value of moisture content in burfi prepared under the various treatment (T₁), (T₂), (T₃), (T₄), and (T₅) khoa to beetroot pulp were 14.75, 19.20, 21.26, 23.39 and 26.29 per cent, respectively. The significantly highest

moisture was noticed in (T₅) 26.29%. It is indicated that as the beetroot pulp level increased, the level of moisture content in burfi also increased. This was due to high moisture content in beetroot pulp (87.56). The results are correlated with Patil (2017) [12] also reported that, the increase in the levels of Wood apple pulp there was increase in the level of moisture content in burfi from (17.48 to 20.08%). Tawade (2015) [17] reported that, moisture content in stevia liquid burfi it under various treatment, 100:0 (T₁) 97.5:2.5 (T₂), 95:5 (T₃), 92.5:7.5 (T₄), and 90:10 (T₅) khoa to stevia liquid were 11.71, 13.96, 15.79, 17.38 and 19.03 per cent, respectively. This indication that as there is increasing in trend of moisture with the increased in level of stevia extract. It was noticed that the moisture content of pulp extract is more compared to khoa.

Conclusions

From the data obtained in the present investigation it is concluded that, the slight variation in chemical composition of burfi was observed due to rate of addition of different levels of beetroot pulp. In respect to fat, protein, total sugar, ash and total solids content (per cent) was decreased while, moisture content was increased with increase in the level of beetroot pulp in burfi.

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