



Research paper

Physico-chemical quality of Burfi Blended with Pineapple Pulp (*Ananas cosmos*)

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Abstract: The study was aimed at evaluating the quality of burfi blended with pineapple pulp. Nine sample of khoa-pineapple pulp blends viz. T₁ (95:5), T₂ (93:7), T₃ (91:9), T₄ (89:11), T₅ (87:13), T₆ (85:15), T₇ (83:17), T₈ (81:19), T₉ (79:21) and control T₀ burfi was analyzed physico-chemical parameter and sensory attributes. The physico-chemical composition of burfi was affected due to addition of pineapple pulp. The flavour, body & texture, overall acceptability, fat, protein and total solid contents decrease with increase in the amount of pineapple pulp while that total solid, fat and protein content in decreasing order. Based on sensory analysis, the pineapple burfi prepared with 19 % pineapple pulp in treatment T₉ scored highest sensory score.

Keyword: Pineapple pulp (*Ananas comosus*), Khoa, Burfi Physico-chemical Analysis.

Introduction:

“The role of milk in nature is to nourish and provide immunological protection for the mammalian young Milk is also a very

complex food with over 100,000 different molecular species found. There are many factors that can affect milk composition such as breed variations, cow to cow variations, herd to herd variations – including management and feed considerations, seasonal variations, and geographic variations. With all this in mind, only an approximate composition of milk can be given: 87.3% water (range of 85.5 - 88.7%); 3.9% milk fat (range of 2.4 – 5.5%); 8.8% solids – non-fat (range of 7.9 – 10.0%), including protein (3.25%), lactose (4.6%), minerals (0.65), acids (0.18%), enzymes, gases, and vitamins.

Due to its role in nature, milk is in a liquid form. This may seem curious if one takes into consideration the fact that milk has less water than most fruits and vegetables. Milk can be described as oil- in- water emulsion with the fat globules dispersed in the continuous serum phase, a colloid suspension of casein micelles globular proteins and lipoprotein particles, minerals, vitamins and other components.” H. Douglas Goff 2007,

Khoa is a heat coagulated, partially dehydrated milk product. It is obtained by

heat desiccation of whole milk to 65% to 70% milk solids without the addition of any foreign ingredients, mostly in private and unorganized sectors of India. It is also known as khoa, khawa, khava, kava, palghoa, or mawa. Due to its large scale consumption nearly six lakh tones of khoa is manufactured annually, which is equivalent to 7% of Indian's total milk production (Banerjee, A.K., 1997; Rajarajan, G., Kumar, C.N., Elango, A., 2007; Kulkarni, R. V., Hembade, A.S., 2009).

Khoa is a rich source of energy, about 458 Kcal per 100 g of the product. The food and nutritive value of khoa is very high. It contains large quantities of muscle building proteins, bone forming minerals, and energy giving fat and lactose. It is also expected to retain most of the fat soluble vitamins A and D, and also fairly large quantities of water soluble B vitamins contained in the original milk. Depending on the end use and the quality of milk used, mainly three commercial type of khoa are identified, namely, Pindi, Dhap, and Danedar which differs in composition, texture and quality. All of these varieties are in demand and are required for making value added khoa based products like Burfi, Pedra, Gulabjamun, Pantua, Kalakand, milk cake, kunda, etc. These products may be potential source for export. Khoa is also used for stuffing vegetables in many food items.

Burfi has a special importance in special importance in social celebration and in the expression of joy and happiness on many occasions. In India 50-55 per cent of total milk produced is converted into traditional milk products (Aneja, 1992). Currently 46 per cent of total milk production in country is consumed is liquid milk and 54 per cent is converted into milk products (Aneja, 1997). It is estimated that 6.5 per cent of the total milk produced in India is converted into khoa and condensed milk. 900,000 tones of khoa worth Rs. 45000

million was produced and consumed by during 1995 (Anonymous, 1997).

Burfi is one of the most popular khoa based sweet, prepared from cow or buffalo milk. Burfi is prepared by heating the mixture of khoa and sugar to a near homogenous consistency followed by cooling and cutting it into small cuboids (Chetana et al., 2010). It basically has mild caramelized flavor. Its colour may vary from light of white, creamy to light brown. Good quality Burfi is characterized by moderately sweet test, soft and slightly greasy body and smooth texture with very fine grains. Due to unique adaptability of khoa in terms of its flavor, body and texture to blend with wide variety of food, various form of Burfi are available with different additives depending on regional preference viz. plain, mawa, chocolate, fig, rawa, cashewnut, coconut, chocolate, etc (Golande et al., 2012; Kamble et al., 2010).

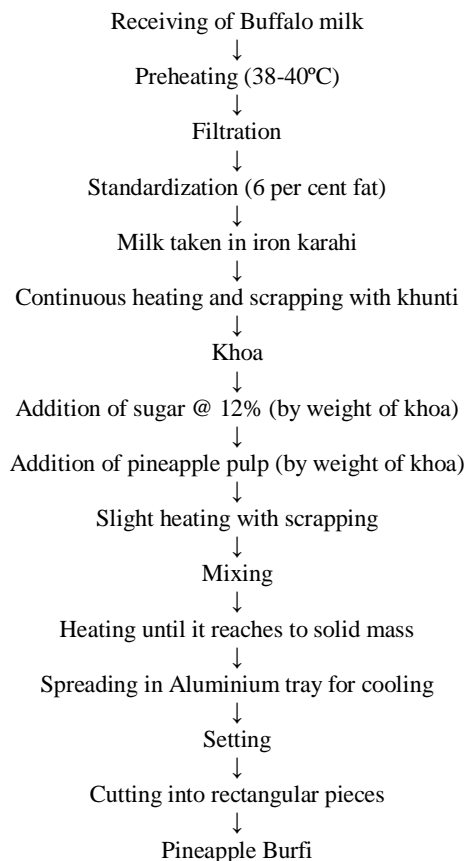
The pineapple is one of the commercial fruit crops of tropical world. Pineapple fruits have characteristics pleasant flavour, distinct aroma, exquisite taste and absence of seeds, which qualifies it as one of the choicest fruit throughout the world. Pineapple belongs to the order *Farinosae* and family *Bromeliaceae*. Pineapple was originated in Paraguay (Anonymous, 2001).

It is a good source of carotene and ascorbic acid and is fairly rich in Vitamin B and Vitamin B2. It also contains phosphorus and minerals like calcium, magnesium, potassium and iron (Rashmi, 2005). It provides adequate roughage to prevent constipation. A piece of 100 g pineapple- flesh contains 87 g water, 0.6 g protein, 0.1 g fat, 12.3 g carbohydrates, 12 mg calcium, 10 mg phosphorus, 0.4 mg iron, 250 mg potassium, 1.5 mg sodium, 8 mg copper, 17 mg magnesium, 50 IU carotene, 0.02 mg vitamin B1, 0.12 mg vitamin B2, 4 mg folic acid, 50 mg ascorbic acid and gives 50 calories of energy (Joy, 2010).

It consists of numerous fruit lets or eyes, developing from a single flower of the inflorescence, which as a whole gives rise to the fruit. The name pineapple is derived from Spanish name 'Pina' gives to the plant, based on the appearance of fruits, which resemble a pinecone. The name was derived from Indian name 'Nana'. This herbaceous, perennial, self-sterile, monocotyledonous plant is of about 90-100 cm in height (Asgekar 2002).

The major pineapple growing countries in the world are Brazil, Thailand, Philippines, India, Nigeria and china. Asia is the major pineapple producing region, contributing 58 % of the world production. India has emerged as the fourth largest pineapple producing country with the share of 7% of world production. Area under pineapple in India is highest in Assam followed by Manipur, west Bengal, Meghalaya, Kerala and Maharashtra (Indian Horticulture Database, 2011: Anonymous, 2005).

Procedure of Methodology:



Materials and Methods:

For the preparation of milk pineapple burfi the treatment combinations were as follows.

To - Control, Whole buffalo milk (standardization with 6 per cent fat)

T₁ - Khoa + 5 per cent pineapple pulp by weight of khoa.

T₂ - Khoa + 7 per cent pineapple pulp by weight of khoa.

T₃ - bkhoa + 9 per cent pineapple pulp by weight of khoa.

T₄ - khoa + 11 per cent pineapple pulp by weight of khoa.

T₅ - khoa + 13 per cent pineapple pulp by weight of khoa.

T₆ - khoa + 15 per cent of pineapple pulp by weight of khoa.

T₇ - khoa + 17 per cent of pineapple pulp by weight of khoa.

T₈ - khoa + 19 per cent of pineapple pulp by weight of khoa.

T₉ - khoa + 21 per cent of pineapple pulp by weight of khoa.

The process for small milk has been described by Sachdeva and Rajorhia (1982). They reported the burfi was prepared by heating a mixture of milk solids (khoa) sugar to a homogeneous consistency followed by cooling and cutting in to small cubes. Beating and whipping operations prior to cooling was practiced to obtain with smooth texture and closely knit body. While preparing pineapple burfi, the buffalo milk standardized to 6 per cent fat was taken in an iron karahi and heated on gentle fire. At the time of boiling, milk was stirred with the help of a khunti in a circular manner @ 100 rpm. The stirring –cum- scrapping process was continued till a pasty consistency was reached. Then

temperature was lowered up to 88-89°C. At this stage, calculated amount of pineapple pulp and sugar @ 12 per cent of khoa were added. Finally this mixture was heated on a low fire with stirring till the desired texture was obtained. It was then spread in a tray and allowed to cool. After setting, pineapple burfi was cut into rectangular blocks.

Result and Discussion:-

By using a completely randomized Design (CRD), levels of pineapple burfi were selected through including control treatment total 29 experiments including control treatment. The sensory evaluation and textural scores as influenced by levels of pineapple pulp.

Table 1:- Physicochemical properties of burfi blended with pineapple pulp

Treatment	Flavour	Body & Texture	Overall acceptability	Total solid	Fat	Protein
T0	8.08	8.08	8.00	83.70	22.09	15.26
T1	7.19	7.36	7.83	82.60	20.79	14.71
T2	7.44	7.27	7.21	82.33	20.03	14.43
T3	8.05	7.88	8.13	82.07	19.30	14.28
T4	7.49	8.11	7.99	81.78	18.49	13.67
T5	7.52	8.19	7.80	81.67	18.32	13.61
T6	8.38	7.94	8.02	81.49	18.28	13.48
T7	8.50	8.41	8.08	81.24	18.13	13.28
T8	9.00	8.88	8.86	80.86	17.89	12.97
T9	8.38	8.14	8.22	80.36	17.72	12.54
SEm±	0.152	0.183	0.128	0.079	0.102	0.064
CD	0.449	0.542	0.378	0.235	0.302	0.190

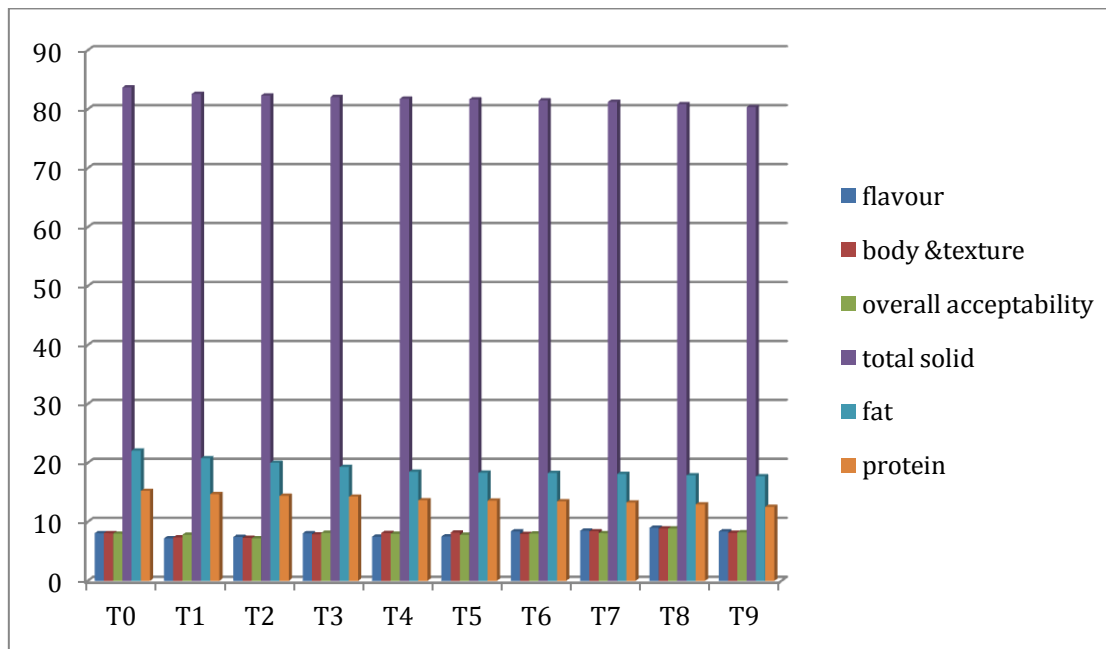


Fig. 1:- Physico-chemical properties of burfi blended with pineapple pulp

The mean chemical composition of pineapple burfi prepared with deferent concentration of pineapple pulp is presented in Table 1. The table of flavour, body & texture, overall acceptability total solid, fat and protein content of pineapple burfi ranged from 7.19 to 9, 7.27 to 8.88, 7.21 to 8.86, 80.36 to 83.70%, 17.72-22.09% and 12.54-15.26 respectively. One way analysis of variance revealed that addition of pineapple pulp significantly affected the physicochemical quality of pineapple burfi.

While studying the effect of pineapple pulp levels on the flavour of burfi up to certain limit, thereafter, it decreases proportionately. Burfi prepared with 19 percent pineapple pulp level, scored the highest mark T₈ (9 out of 9) while the lowest score T₁ (7.19) secured by the burfi blended with 5 per cent pineapple pulp i.e. T₁. Statistically treatment T₈ with 19 percent pineapple pulp was superior among all the treatment.

The body and texture of burfi seems to be mainly depending on concentration of pineapple pulp. The highest scored was obtained T₈ (8.88 out of 9) by the burfi

prepared from 19 percent pineapple pulp while, the lowest score T₂ (7.27) secured by the burfi which was prepared from 10 per cent pineapple pulp.

Overall acceptability of burfi on 9 point hedonic scale revealed that the highest score T₈ (8.86 out of 9) was rated from the panel of judges to burfi prepared from 19 per cent level of pineapple pulp while, the lowest score T₂ (7.21 out of 9) was secured by the burfi which was prepared from 10 per cent pineapple pulp

The highest mean score for total solid percentage of burfi (83.7) was obtained for T₀. The minimum score (80.36) was obtained by T₉. The difference between the treatments was found significant (Table 1). The highest mean score for fat (22.09) was obtained for treatment T₀ and the minimum score (17.72) was obtained by T₉. The difference between the treatments was found significant (Table 1).

The highest mean score for protein (15.26) was obtained for treatment T₀ and the minimum score (12.54) was obtained by T₀. The difference between the treatments was found significant (Table 1).

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