

# Nutritional Enhancement of Traditional Coconut Burfi with Incorporation of Vegetable Fibres

<sup>[1]</sup> P. D. Shere, <sup>[2]</sup> Madhav Khanzode, <sup>[3]</sup> Prajakta Kolhe

<sup>[1][2][3]</sup> P.D Shere- MIT College of Food Technology, MITADT University, Pune

**Abstract-** Efforts were made in present investigation to develop nutritionally enhanced coconut burfi with inclusion of vegetable fibres and to assess physico-chemical, organoleptic characteristics. Carrot & Beetroot were selected as source of vegetal fibres for enrichment purpose. The coconut burfi formulation was standardized with incorporation of different proportions of beetroot & carrot pulp. Coconut burfi samples were prepared using standard procedure with freshly grated coconut, beetroot & carrot. Samples were organoleptically evaluated with semi-trained panelists. Physico-chemical analysis was performed for carbohydrate, fat, protein, iron, B-carotene for all the burfi samples. Results of organoleptic evaluation revealed that, vegetable fibre enriched beet-carrot coconut burfi was preferred over control. This may be because of higher moisture retention, soft, chewy texture and bright red colour of burfi. Chemical analysis results showed decreased carbohydrate content, and increased iron, B-carotene, crude fibre content compared to control.

**Keywords:** Coconut burfi, beetroot, carrot, vegetable fibre.

## I. INTRODUCTION

Burfi, is Indian sweet prepared from milk solids, sugar. Different varieties of burfi can be prepared by changing the basic ingredient used in its preparation like pista, besan, cashew nut, mango, coconut etc. (Navale A.S. et al., 2014). Coconut burfi is traditional Indian dessert made from freshly grated coconut, milk solids usually khoa and sugar syrup. Carrots are good source of dietary fibres, vitamin A (carotenoids). The antioxidant properties of vitamin A necessary for the growth and maintenance of body tissues, eye and skin health, improving body's immune system against infections (Singh et al.2006). Therefore, carrots can be exploited as an ingredient. Beetroot is rich in insoluble fibre, essential vitamins, minerals such as potassium, magnesium, folic acid, iron, zinc, calcium and phosphorus and coloring pigment betalaine (Kanner et al., 2001). Beetroot possess anti-cancer properties (Kapadia et al., 1996), fights against infections (Rasic et al., 1984). It is also rich source of a polyphenolic compounds (Kaur and Kapoor 2002; Pitalua et al. 2010) providing antioxidant benefits (Wootton-Beard et al., 2011) Inclusion of vegetable fibres such as carrot and beetroot in coconut burfi has not been tried so far. Therefore, objective of this study was to nutritionally enhance traditional coconut burfi by incorporating vegetable fibres in the form of vegetable puree with beetroot and carrot as an ingredient in formulation and to assess the organoleptic & physico-chemical characteristics of formulated burfi.

## II. MATERIAL & METHOD

### Procurement of material

Materials viz., coconut, sugar, ghee, beetroot, carrot, milk powder, carrot, khoa were procured from the local market, Pune.

### Equipment & Machineries

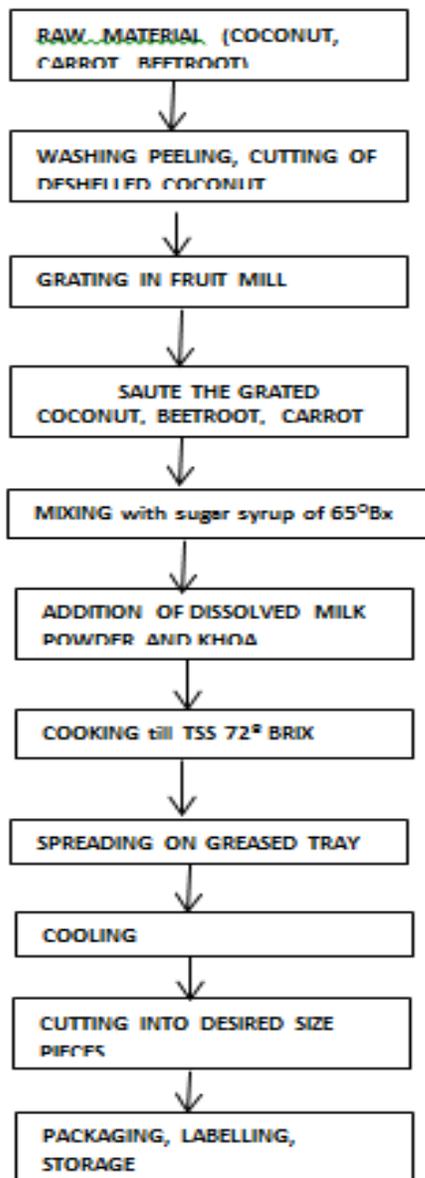
Equipment like weighing balance, fruit mill, hand refractometer, thermometer, hot air oven, and other utensils required were used from the Department of Food Process & Product Technology, MIT College of Food Technology, MITADT University, Pune. Standardization of recipe for coconut beetroot-carrot burfi The formulation of coconut burfi was standardized in laboratory by using grated coconut, khoa, milk powder, beetroot puree, carrot puree. For preparation of nutritionally enriched burfi the level of vegetable fibre in the form of puree were standardized. The product was standardized based on sensory score.

**Table 1:** Formulation of coconut burfi with different

Ingredients	S0	S1	S2	S3
	%	%	%	%
Grated Coconut	40	27	27	27
Sugar	32	27	27	27
Water	13	11	11	11
Grated Beetroot	-	20	-	10
Grated Carrot	-	-	20	10
Milk Powder	5	5	5	5
Ghee	4.7	4.7	4.7	4.7
Khoa	5	5	5	5

Preparation of Coconut, beetroot & carrot puree: The coconuts were deshelled manually in laboratory, grated in fruit grater. The washed, peeled carrot & beetroot were grated in fruit mill to obtain the purees.

**Preparation of Burfi:** As per the formulation (Table No.1), calculated amount of grated coconut, beetroot, carrot were heated in open pan with continuous stirring & tossing to evaporate moisture. The mixture was then mixed with calculated amount of khoa, sugar syrup of 65 OBx, milk powder dissolved in water. The whole mass was cooked till the end point reaches to 72OBx. The cooked mass was spread on greased tray & was allowed to cool. The final product was cut into desirable size pieces.



**Fig 1: Flow sheet for the preparation of Beetroot carrot coconut burfi**

Proximate composition of burfi: Chemical constituents like moisture, protein, fat, beta-carotene, iron, crude fibre content of burfi were determined by AOAC, (2003).

**Sensory evaluation of burfi:** The four variants of burfi (S0, S1, S2, S3) were evaluated for sensory characteristics like colour and appearance, flavour, texture, taste and overall acceptability using 9 point hedonic rating by using semi-trained panel members.

**Results and discussion:** The study was undertaken to evaluate the effect of incorporation vegetable fibres in coconut burfi as per the formulation depicted in Table 1 and the sensory score obtained for the present study is depicted in Table 2.

**Table 2: Sensory evaluation of different variants of burfi**

Evaluation Parameters	S0	S1	S2	S3
Appearance & colour	7	8	8	8
Texture	7	7.5	8	8.5
Taste	7.5	8	8.2	8.6
Flavour	7.2	7.4	7.8	7.8
Overall Acceptability	7.2	7.8	8	8.5

**Colour & appearance:** Sample S1, S2, S3 scored high on colour & appearance compared to control because of addition of beetroot & carrot in formulation which contain natural coloring pigment.

**Taste:** It is clearly observed from sensory evaluation results that the taste of coconut burfi was significantly affected by addition of vegetable puree. The sample S3 obtained highest sensory score (8.6) among all the samples whereas the sample S1 and S2 also showed more score compared to control sample. The taste of burfi with vegetable fibres was preferred over control which may be due to the inherent sweetness of carrot and beetroot.

**Flavor:** The flavour of coconut burfi was slightly improved with addition of vegetable over control sample.

**Texture:** The texture of product was greatly improved with incorporation of beetroot & carrot fibres. The sample (S3) showed maximum score on texture. The improvement in textural qualities of coconut burfi with addition of vegetable fibre may be due to water binding capacity of insoluble fibres giving the desired softening & moisture retaining properties in burfi (Kumar et al., 2010).

**Overall Acceptability:** Most of the parameters such as color, flavour, taste and texture were improved with addition of vegetable fibres in the form of puree in burfi. Hence, it can be concluded that the overall acceptability of sample S3

was greatly improved with maximum (8.5) score compared to control sample (7.2).

**Table 3: Chemical composition of burfi samples (per 100g)**

Nutritional Information	S0	S1	S2	S3
Moisture(%)	6.2	7.4	7.6	7.4
Protein(g)	1.05	1	1.04	1.2
Fat(g)	20.2	15	14.6	14
Carbohydrate(g)	62.1	47	45.4	44
Energy(kcal)	434.4	327	317.16	306.8
Crude fiber(g)	1.1	1.8	1.85	2.5
Iron(mg)	0.2	0.7	0.5	0.75
Beta-carotene( $\mu$ g)	-	-	1135	765

Table 3 represents the chemical composition of burfi samples. Vegetable added burfi had more moisture content compared to control which may be due to the incorporation of vegetable puree in burfi. Total crude fibre was highest in S3 (2.5g) and beta-carotene content was found to be the highest in S2 (1135 $\mu$ g). The beta-carotene content in carrot burfi was more compared to other variants, the results are in parity with Mridula (2011). The average fat content in the burfi was significantly affected due to addition of vegetable pulp. Fat content in burfi was highest in S0 (20.2). Fat content was decreased as the vegetable pulp in burfi increased. This might be due to low fat content in Beetroot & carrot. Results are in correlation with (Charis Kharkongor Ripnar et al., 2015) & (Kamble et al., 2010).

### III. CONCLUSION

It may be concluded that a combination of food groups will improve the nutritive value of a product. A good quality of coconut burfi incorporated with beetroot & carrot can be prepared. Treatment combination S3 with 10 part of beetroot and 10 part of carrot was highest in all the organoleptic parameters. Beetroot & carrot possess diverse medicinal uses including anti-carcinogenic, antioxidant properties, and rich in dietary fibres hence can serve as healthy ingredients in human diet.

### REFERENCES

1. AOAC Association of Official Analytical Chemist]. The Official Methods of Analysis of AOAC International Association of Official Analytical Chemists. (17thEd.). Association of Official Analytical Chemist, Washington D.C, 2003 AOAC, (2003)
2. Charis Kharkongor Ripnar, Umadevi S. Hiremath, Anitha S.. Formulated Nutri-Dense Burfi and Its Physico-Chemical Components. Journal of Food and Nutrition Sciences. Vol. 3, No. 3, 2015, pp. 108-113. doi: 10.11648/j.jfns.20150303.15
3. Kamble, K., Kahate, P.A., Chavan,S.D. and Thakare, V.M.(2010). Effect of pine-apple pulp on sensory and chemical properties of burfi. Veterinary World 3:329-331.
4. Kanner J, Harel S, Granit R (2001) Betalains—a new class of dietary cationized antioxidants. J Agric Food Chem 49(11):5178–5185
5. Kapadia GJ, Tokudab H, Konoshimac T, Nishino H (1996) Chemoprevention of lung and skin cancer by Beta vulgaris (beet) root extract. Cancer Lett 100(1–2):211–214
6. Kaur C, Kapoor HC (2002) Anti-oxidant activity and total phenolics content of some Asian vegetables. Int J Food Sci Technol 37:153–161
7. Kumar, N., Sarkar, B.C. and Sharma, H.K. (2010). Development and characterization of extruded product of carrot pomace, rice flour and pulse powder. African Journal of Food Science 4:703 – 717.
8. Mridula, D. (2011). Physico-chemical and sensory characteristics of  $\beta$ - carotene rich defatted soy fortified biscuits.African Journals of Food Science 5: 305-312.
9. Navale, A. S., Deshmukh, B. R., Korake, R. L., Narwade, S. G. and P.R. Mule (2014).Production profile, proximate composition, sensory evaluation and cost configuration of wood apple burfi. Animal Science Reporter 8 (3): 114-120.
10. Pitalua E, Jimenez M, Vernon-Carter EJ, Beristain CI (2010) Antioxidative activity of microcapsules with beetroot juice using gum arabic as wall material. Food Bioprod Process 88:253–258
11. Rasic JL, Bogdanovic G, Kerenji A (1984) Anti-cancer properties of lactic acid-fermented beetroot juice. Fluss Obst 51(1):25–28
12. Singh, B., Panesar, P. S. and Nanda, V., 2006, Utilization of carrot pomace for the preparation of a value added product.World Journal of Dairy & Food Sciences1(1): 22-27.
13. Wootton-Beard PC, Moran A, Ryan L (2011) Stability of the total antioxidant capacity and total polyphenol content of 23 commercially available vegetable juices before and after in vitro digestion measured by FRAP, DPPH, ABTS and Folin–Ciocalteu methods. Food Res Int 44:217–224.