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Development and quality evaluation of burfi prepared by using soya flour (*Glycine max*) and *Moringa oleifera* leaf powder

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Abstract
The *Moringa oleferia* it is considering one of the most useful trees in the world because most of all parts of this plant can be used as food, in medicines and for industrial purpose. Purpose of the study was to development of burfi prepared by using soya flour and *Moringa oleferia* leaf powder. The percentage of khoa and soya flour use in the burfi are 10%, 20% and 30%for different ratio of burfi BC (100), B1 (90:10), B2 (80:20) and B3 (70:30) were generated. *Moringa oleferia* leaf powder was added 2% in all samples except control. Its leaves are rich of nutrients and bio- active compound. Moisture 17.73 gm % and fiber 5.67 gm % content was higher in B1, total solid 78.4 gm %, fat 21.07 gm %, CHO 26.40 gm %, energy 430.67 Kcal and calcium 298.15 mg% was higher in BC, ash 3.3 gm %, protein45.5 gm% and flavonoid 21.92 mg % content was higher in B3, phosphors 132.14mg% and phenol 68.73 mg% content was higher in B2. There was highly a significances difference. B1 burfi exhibited the highest hardness, stickiness, adhesiveness, gumminess, chewiness, resilience except springiness.

Keywords: *Moringa oleferia* leaf (dry) powder, soya flour, khoa, burfi, nutritional analysis and textural properties

Introduction
Moringa oleferia is commonly known as drumstick tree and is a part of the family called moringaceae (Arora *et al*. 2013) [1]. *Moringa oleferia* has been found to be good sources of polyphenols and antioxidant (Mishra *et al*. 2011) [15]. Phytochemicals such as vanillin, omega fatty acids, carotenoids, acrobats, tocopherols, beta-sitosterol, moringine, kaempferol, and quercetin have been reported in its flower, roots, fruits, and seeds. Every part of *M. oleferia* is store house of important nutrient and antinutrients. The leaves, in particular have been found to contain phenolics and flavonoids these compounds have various biological activities, including antioxidant, anticarcinogenic, immunomodulatory, antidiabetic, antiatherogenic and hepatoprotective functions and the regulation of thyroid status (Mbikay and Verma *et al*. 2009, Cajuday *et al*. 2009 and Khalafalla *et al*. 2010) [12, 27]. Moreover, leaves contain trace elements that are essential to human health, for instance, magnesium, iron, selenium, and zinc play an important role in metabolism, and interest in these elements is increasing together with reports relating trace element status and oxidative diseases (Pelus *et al*. and Shazia *et al*. 2012) [18].

The Soybean plant (*Glycine max*) belongs to the legume family and also called meat of the field from ancient time. Soybeans also contain biologically active or metabolic proteins such as enzymes, trypsin inhibitors, hem agglutinins, and cysteine proteases very similar to papain. The soy cotyledon storage proteins are important for human nutrition (Patil 2005) [17]. Soybeans are processed into three kinds of modern protein rich products soy flour, soy concentrate, and soy isolate. Soy protein contains phytoestrogens, which bind to estrogen receptors in the body. Some studies suggest that high levels of phytoestrogens may increase the risk of certain forms of cancer (Anderson and Ward 1997).

Burfi is most popular khoa based swe*et a*ll over India (Dharmadhikari 2002) [8]. The unique adaptability of khoa in terms of its flavour, body to blend with a wide range of food adjust had permitted development of an impressive array of burfi varieties (Kapila 2010) [11]. Burfi is covers a wide range of product variations that include plain, dudh, chocolate, fruit and coconut burfi (Varma *et al*. 2013) [26]. According to the Bureau of Indian Standard (BIS 1970) the different varieties of burfi sold in the market. Like a milk or mawa burfi containing mainly khoa and sugar with or without added colouring and flavouring agent like fruit, nut, chocolate, burfi containing khoa, sugar, and the special ingredients (Sarkar *et al*. 2002) [22]. The present research work was investigation on Development and Quality evaluation of burfi prepared by using soya flour (*Glycine max*) and *Moringa oleifera* leaf powder.

Materials and methods
Collection of materials
The *Moringa oleferia* leaf for this research were collected forms APMS (Anand people Medicare society), soya flour, milk (amul gold), ghee, sugar were procedure from the local grocery market of Anand, Gujarat.

Standardization of burfi
Procedure of product
From locally available ingredients is used i.e. khoa, soya flour, *Moringa oleferia* leaf powder, sugar and ghee. Khoa and soya flour used in different ratios. The ghee was added and heated. Gently than added soya flour, *Moringa* leaf powder and khoa till pot formation. Add refined sugar by creaming method till it becomes smooth batter. The mixed batter and spread on a plate and flattened. It was cut into a desired shaped and kept in room temperature.

Table 1: Composition of Control and Burfi prepared by using soya flour and *Moringa oleferia* leaf powder

Ingredients (gm.)	B_c	B_1	B_2	B_3
Khoa	100(74.07)	90 (65.79)	80(58.40)	70(51.10)
Soya flour	-	10 (7.30)	20(14.60)	30 (21.90)
Moringa leaf powder	-	2(1.46)	2(1.46)	2(1.45)
Sugar	30(22.23)	30 (21.80)	30(21.90)	30(21.89)
Ghee	5 (3.70)	5 (3.65)	5(3.65)	5(3.65)
Total	100(135)	100 (137)	100(137)	100(137)

Preparation of Burfi

Using the different combination of khoa and soya flour in different ratios also using all the ingredients were prepared for burfi.

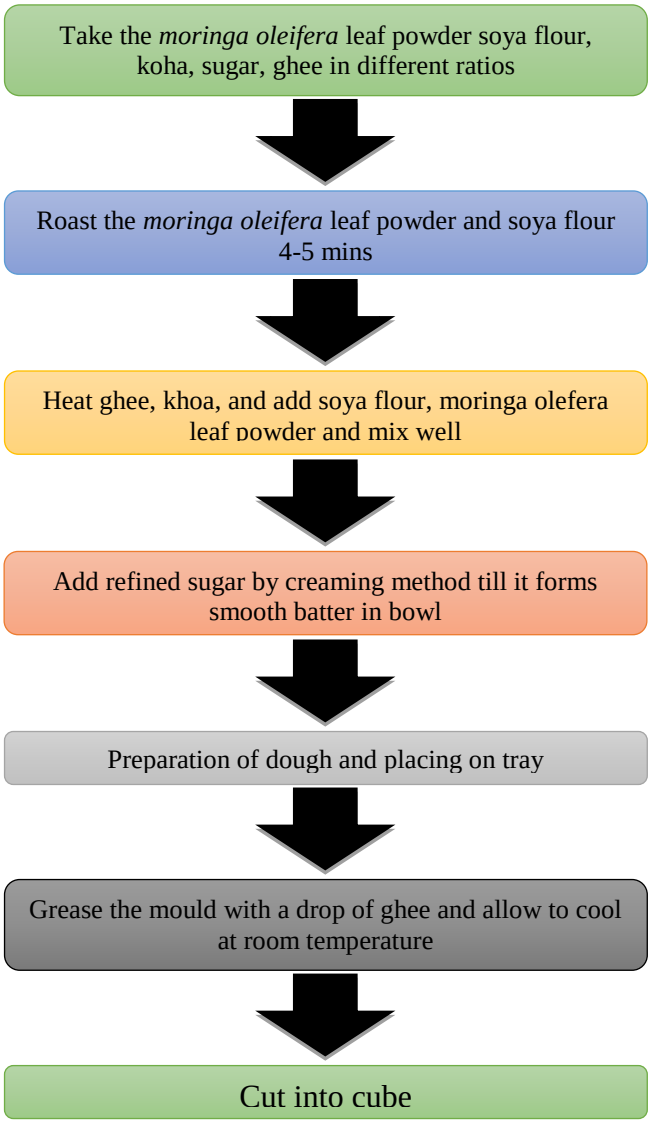

Fig 1: Experimental Design of burfi prepared by using soya flour and *Moringa oleferia* leaf powder

(B_c) **(B_1)** **(B_2)** **(B_3)**

Fig 2: Burfi prepared by using soya flour and *Moringa oleferia* leaf powder

B_c= Plain khoa burfi (khoa 100gm + sugar 30gm + ghee 5gm)
B_1= Khoa (90gm) + soya flour (10gm) + moringa leaf powder (2gm) + sugar (30gm) + ghee (5gm).
B_2= Khoa (80gm) + soya flour (20gm) + moringa leaf powder (2gm) + sugar (30gm) + ghee (5gm).
B_3= Khoa (70gm) + soya flour (30gm) + moringa leaf powder (2gm) + sugar (30gm) + ghee (5gm).

Determine Physico-chemical constituents of the product

1. **pH:** The pH content was determined by (M. tronoic digital-255) pH meter.
2. **Titrable acidity %:** The titrable Acidity estimation done by method of (Ranganna 1986) [19].
3. **Moisture:** The moisture content was determined by (AOAC, 1980) [3].
4. **Total solid:** The total solid content was determined by the method described in IS 1479 (part -2) 1961.
5. **Ash:** Ash content of sample was determined according to (AOAC, 1980) [3].

Determine nutritional constituents of the product

1. **Fat:** Fat extraction was determined by the method given by Soxhlet method according to (AOAC, 1980) [3].
2. **Protein:** Protein was estimated by the method given by kejeldhal method in (AOAC, 1980) [3].
3. **Fibre:** Fibre was done according to (AOAC, 2000) [4] method.
4. **Calcium:** Calcium was estimated by the tetrameter method of (Clark and Collip, 1925) [7].
5. **Phosphorous:** Phosphorous was determine by the method of (Fisk and Subbarow,1925)
6. **β carotene:** β carotene was estimated by the Column chromatography
7. **Carbohydrate:** CHO was estimated by (AOAC, 1980) [3].
8. **Energy:** Energy was estimated by (AOAC, 1980) [3].

Determine antioxidant constituents of the product

1. **Total Phenol mg%:** Total Phenol Concentration was assayed using FolinCioculten method as described by (Singleton *et al.*, 1999) [25].
2. **Flavonoid mg%:** The estimation of Flavonoid was done by the (Woisky, R. and salvation.A.1998) [29].
3. **Vitamin C:** Vitamin C was estimated by dichlorophenol Indophenol method by Rao B. & Dashpande V., 2006 [20].

Texture analysis

Texture profile analysis (TPA) of burfi was carried out room temperature using TA-HD, plus texture analyser college of food processing technology and bio- energy Anand Agriculture University. Texture analyser with 75mm diameter cylindrical flat probe with test speed of 0.50mm/sec. the burfi were evaluated by compressing them with twice of about 100 gm of force. Textural variable from force and area measurement were hardness, gumminess, chewiness, and resilience (Miguel, *et al*., 1999). Texture variables from force and area measurements were hardness= peak force (g) during first compression cycle, springiness= height that the sample recovers during the time that elapses between the end of first bite and the start of the second bit (cm) springiness= length 2/ length 1, resilience is determined automatically by dividing the area during probe withdrawal from the first compression by the area of the first compression. Resilience=Area5/ Area4, gumminess = Area 1/Area 2 × hardness (force2) and chewiness= Gumminess × length 2/length 1. Four burfi from each formulation were used to evaluate textural parameters. A test parameter were analysed by using software Exponent.

Statistical analysis

Statistical analysis of the data was carried out using single factor one-way analysis of variance (ANOVA), (M.S office excel) to determine the acceptability of the development of burfi using soya flour and *moringa oleferia* leaf powder. The significance level of $p \leq 0.01$& $p \leq 0.05$ and F value were considered.

Results and Discussion

Table 2: Mean value of pH, Acidity, Ash, Moistutre, Total solid and Fat content in developed burfi by using soya flour and *Moringa oleferia* leaf powder

Samples	pH	Acidity (%)	Ash (gm %)	Moisture (gm %)	Total solid (gm %)	Fat (gm %)
B_c	6.16±0.04	0.24±0.01	2.5±0.87	16.67±1.15	78.4±2.11	21.07±0.50
B_1	6.34±0.05	0.22±0.005	2.17±0.29	17.73±1.63	75.7±4.24	18.67±1.01
B_2	6.55±0.01	0.25±0.005	2.17±0.29	20.20±0.35	64.4±0.87	16.60±0.72
B_3	6.54±0.006	0.27±0.00	2.33±0.29	17.53±2.14	64.4±0.87	18.00±0.4
F- value	82.08	33.11	0.30	3.18	27.25	21.46
Significance Difference	HS	HS	NS	S	HS	HS

Table 3: Mean value of Protein, Fiber, Calcium, Phosphorous, CHO and Energy content in developed burfi by using soya flour and *Moringa oleferia* leaf powder

Samples	Protein (gm %)	Fibre (gm %)	Calcium (mg %)	Phosphorous (mg %)	CHO (gm %)	Energy (K Cal)
B_c	33.83±2.021	0±0	298.15±22.74	130.12±1.20	26.40±2.65	430.67±6.81
B_1	40.83±2.021	5.67±0.29	125.93±22.73	130.01±1.21	15.60±2.30	393.73±10.74
B_2	42±3.50	4.83±0.76	116.67±11.79	132.14±2.08	14.03±0.76	373.53±3.44

B_3	45.5±3.50	5.5±0.50	118.52±13.03	129.77±1.85	16.63±3.87	391.87±8.69
F- value	8.79	94.78	205.21	4.087	13.47357	27.63452
Significance Difference	HS	HS	HS	HS	HS	HS

Table 4: Mean value of Flavanoid and Phenol content in developed burfi by using soya flour and *Moringa oleferia* leaf powder

Samples	Flavonoid (mg %)	Phenol (mg %)
B_c	3.38±0.08	16.46±0.62
B_1	17.79±0.11	66.46±0.87
B_2	19.83±0.09	68.73±0.87
B_3	21.92±0.14	68.23±0.81
F- value	18222.1	3090.8
Significance Difference	HS	HS

Table 2 show the pH and Acidity (%) in control and using soya flour and *moringa oleferia* leaf powder burfi. The pH content was higher in B_2 (6.55 ± 0.01) and lower in B_C (6.16 ± 0.04) as compare to B_1 (6.34 ± 0.05) and B_3 (6.54 ± 0.006). There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The moisture content was higher in B_2 (20.20±0.35) and lower in BC (16.67±1.15) as compare to B_1 (17.73±1.63) and B_3 (17.53±2.14). There was a significances difference at level of *P ≤ 0.05 between control and experimental burfi. The total solid content was higher in B_C (78.4±2.11) and lower in B_3 (64.4±0.87) as compare to B_1 (75.7±4.24) and B_2 (65.4±0.87). There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The Ash (gm %) content was higher in B_C (2.5±0.87) and lower in B_3 (2.33±0.29) as compare to B_1 (2.17±0.29) and B_2 (2.17±0.29). There was a non-significance difference at level of ≥ 0.05 between control and experimental burfi. The Fat (gm %) content was higher in B_C (21.07±0.50) and lower in B_2 (16.60±0.72) as compare to B_1 (16.60±0.72) and B_3 (18.00±0.4). There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi.

Table 3 show the The protein (gm %) content was higher in B_3 (45.5±3.50) and lower in BC (33.83±2.021) as compare to B_1 (40.83±2.021) and B_2 (42±3.50). There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The fibre (gm %) content was higher in B_1 (5.67±0.29) and lower in B_2 (4.83±0.76) as compare to B_3 (5.5±0.50). B_C content 0 fiber There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The calcium (mg %) content was higher in B_C (298.15±22.74) and lower in B_2 (116.67±11.79) as compare to B_1 (125.93±22.73). B_3 (118.52±13.03) There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The phosphorous (mg %) content was higher in B_2 (132.14±2.08) and lower in B_3 (129.77±1.85) as compare to B_1 (130.01±1.21). B_C (130.12±1.20) There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The CHO (gm %) content was higher in B_C (26.40±2.65) and lower in B_1 (15.60±2.30) as compare to B_2 (14.03±0.76) and B_3 (16.63±3.87) There was a highly significance difference There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The energy (Kcal) content was higher in B_C (430.67±6.81) and lower in B_3 (391.87±8.69) as compare to B_1 (393.73±10.74) and B_2 (373.53±3.44) There was a highly significance difference There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi.

Table 4 shows The flavonoid (mg %) content was higher in B_3 (21.92±0.14) and lower in B_C (3.38±0.08) as compare to B_1 (17.79±0.11) and B_2 (19.83±0.09) There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi. The phenol (mg %) content was higher in B_2 (68.73±0.87) and lower in B_C (16.46±0.62) as compare to B_1 (66.46±0.87) and B3 (68.23±0.81) There was a highly significance difference at level of **P ≤ 0.01 between control and experimental burfi.

Table 5: Texture properties of control and Developed burfi

Texture attributes	B_c	B_1	B_2	B_3
Hardness	142.00	296.29	207.37	87.04
Stickiness	-10.31	-46.10	-29.05	-17.56
Adhesiveness	-7.31	-21.36	-11.44	-16.41
Springiness	0.20	0.19	0.18	0.23
Gumminess	29.06	55.33	42.08	21.51
Chewiness	5.84	10.65	7.64	4.87
Resilience	0.04	0.06	0.05	0.04

Table 5 shows the textural properties of developed burfi using soya flour and *moringa oleferia* leaf powder.

The hardness value ofdeveloped burfi using soya flour and *moringa oleferia* leaf powder and control.in terms of hardness the B_2 showed highest hardness value (296.29) and lowest in B_3 (87.04). As compared to B_c (142.0) and B_1 (207.3).

The stickiness value ofdeveloped burfi using soya flour and *moringa oleferia* leaf powder and control.in terms of stickiness the B_1 showed higheststickiness value (-46.10) and lowest in B_c (-10.31). As compared to B_2 (-29.05) and B_3 (-17.56).

The adhesiveness value ofdeveloped burfi using soya flour and *moringa oleferia* leaf powder and control.in terms of adhesiveness the B_1 showed highestadhesiveness value (-21.36) and lowest in B_c (-7.31). As compared to B_2 (-11.44) and B_3(-16.41).

The springiness value ofdeveloped burfi using soya flour and *moringa oleferia* leaf powder and control.in terms of springiness the B_3 showed highestspringiness value (0.23) and lowest in B_c2(0.18). As compared to B_c (0.20) and B_1 (0.19).

The gumminess value ofdeveloped burfi using soya flour and *moringa oleferia* leaf powder and control.in terms of gumminess the B_1 showed highestgumminess value (55.33) and lowest in B_3 (21.51). As compared to B_c (26.06) and B_2 (42.08).

The chewiness value ofdeveloped burfi using soya flour and *moringa oleferia* leaf powder and control.in terms of

chewiness the B_1 showed highestchewiness value (10.65) and lowest in B_3 (4.87). As compared to B_c (5.84) and B_2 (7.64).

The resilience value ofdeveloped burfi using soya flour and *moringa oleferia* leaf powder and control.in terms of resilience the B_1 showed highestresilience value (0.06) and lowest in B_3 and B_c (0.04). As compared to B_2 (0.05).

Physico- chemical and textural properties of santra burfi as influenced by orange pulp content.in this study shows that burfi were prepared with addition of orange pulp in sweetened khoa is popularly known as santra burfi in Maharashtra and it has great commercial potential owing to its typical taste. Five types of santra burfi like T0 (plain burfi), T1 (5 % orange pulp + 95 % khoa and sugar mixture), T2 (10 % orange pulp + 90 % khoa and sugar mixture), T3 (15 % orange pulp + 85 % khoa and sugar mixture), T4 (20 % orange pulp + 80 % khoa and sugar mixture) and T5 (25 % orange pulp + 75 % khoa and sugar mixture). The chemical analysis of santra burfi such as titratble acidity, protein, and ash contents were determined. The santra burfi was tasted for various textural properties such as hardness, cohesiveness, gumminess, chewiness, adhesiveness and springiness with TA-XT2i texture analyser using two bite compressions **(**Prashant W *et al*. 2013) [28].

Conclusion

Our research conclude that Developed burfi prepared by using soya flour and *Moringa oleferia* leaf powder showed higher value of in B3 for pH (6.55 ± 0.01,) B3 for acidity (%) (0.27 ± 0.00), B2 for moisture (20.20 ± 0.35), B3 for ash (2.33 ± 0.29), B3 for protein (45.5 ± 3.50), B3 for fiber (5.5 ± 0.50), B3 for flavonoid (21.92 ±0.14) and B2 for phenol (68.73 ± 0.87) as compared to control. During textural properties B1 burfi exhibited the highest hardness (296.29), stickiness (-46.10), adhesiveness (-21.36), gumminess (55.33), chewiness (10.65), resilience (0.06) except springiness (0.19). There for *Moringa oleferia leaf to* be used as nutraceuticals and functional ingredients.

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