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Preparation of Oats *Burfi* incorporated with jaggery

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Abstract
Oats Burfi can be prepared by using oats, Jaggery, peanut, coconut, cardamom, ghee and almonds. For preparation all the ingredients mixed together and heating at low flame to get solid consistency. Mostly Burfi prepared using sugar but we used Jaggery as a natural sweetener for preparation of Burfi and nutritional point of view Oats used. Oats contains proteins and minerals. Burfi soft texture during storage is the limiting factor for shelf life; the product remained chemically and microbiologically safe and stable during entire storage. Effect has been made to formulate and standardized the production of Burfi and result obtained are summarized as follows; the physicochemical properties was obtained as evident that Burfi reach in Protein contain. Sensory evaluation of Burfi was carried out & score recorded was T1 sample observed higher score of color, consistency, appearance, taste and overall acceptability selected for further study. The Proximate analysis was carried out and score recorded was obtained T1 sample observed as Ash content 4.3%, fat content 20%, protein content 14.92% and carbohydrate content was found to be 40.80%. Energy values was found to be 290 Kcal respectively. Storage effect on product was good on up to 15 days at ambient temperature. The significant changes were noticed in colour, consistency, appearance and taste during 15 days of storage.

Keywords: Oats, Jaggery, shelf life, sensory evaluation, proximate analysis, storage etc

Introduction

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 in small cuboids. It basically has mild caramelized flavor.Its colour may vary from light off weight, creamy to light brown.Good quality characterized by moderately sweet taste, soft and slightly greasy body and smooth texture with very fine grains. Due to unique adaptability of khoa in terms of its flavour, body and texture to blend with wide variety of food, various forms of burfi are avalaible with different additives depending on regional preference *viz*. plain mawa, rawa, fig, coconut, chocolate etc (Golande *et al*., 2012; Kamble *et al*., 2010) [11].

Oats' nutritional composition differs significantly from that of other cereals, with high protein content and an ample amount of essential amino acids. Oats have a higher fat content (6–10%) than wheat and most other cereals (2-3%). It had the highest fat content of any cereal, with a high percentage of unsaturated fats. The high nutritional value of oats is also due to their high *β*-glucan content. Beta-glucan is a vital functional component in various food industries. Furthermore, oats possess more than 20 unique polyphenolic compounds known as avenanthramides. The antioxidant activity of avenanthramides is 10 to 30 times higher than that of other cereals' polyphenolic compounds such as ferulic acid, gentisic acid, p-hydroxybenzoic acid, protocatechuic acid, syringic acid, vanillic acid, and vanillin (Getaneh Firew Alemayehu et. al, 2023) [4].

Oats are excellent sources of different dietary fibre components of mixed-linkage (1→3), (1→4)-β-D-glucan arabinoxylans and cellulose. The neutral cell wall of polysaccharide β-glucan has outstanding functional and nutritional properties. It achieves high viscosities at relatively low concentrations and is of particular importance in human nutrition. Oat consumption in human diet has been increased because of health benefits associated with dietary fibres such as β-glucan, functional protein, lipid and starch components and phytochemicals present in the oat grain. Oat has a well-balanced nutritional composition. It is a good source of carbohydrates and quality protein with good amino acid balance. Oat contains high percentage of oat lipids especially unsaturated fatty acid, minerals, vitamins and phytochemicals (Syed SJ, Gadhe KS and Katke, 2020) [1].

Jaggery (also called gur or gul in native language) is a solid or semi solid product of sugarcane, which is obtained from concentrating cane juice by addition of organic and inorganic purifying substances during manufacturing process. Jaggery making has become an important cottage industry of rural India and Pakistan, because a large number of people are engaged in the form of cane harvesting, Jaggery manufacturing, its sale and marketing etc. This is why it is playing a pivotal role in uplifting the economic condition of rural masses. Similarly its production has been increasing for the last few years and its total production is 416.6 thousand tons (Anonymous, 2005).

Chemical and nutritional composition of Jaggery are Carbohydrate, % 83.5-95.0 Sucrose 72.8-80.3 Reducing sugar 6.8-14.2 Minerals, % 0.6-2.6 Calcium 0.2-0.36

Chloride 0.2-0.34 Phosphorus 0.03-0.22 Potassium 0.10-0.16 Sodium 0.006-0.025 Iron 0.005-0.020 Magnesium 0.008-0.105 Copper 0.007-0.010 Cobalt, nickel and molybdenum 0.001-0.008 Protein, % 0.35-0.40 No protein nitrogen (mg/i 00 g) 19.6-42.9 Protein nitrogen (mg). The color of Jaggery varies from golden brown to dark brown and its constitute of 50% sucrose, 20% invert sugar, 20% moisture, and remainder is insoluble matter such as ash, protein, and bagasse fines. It contains all the vitamins. It is rich in important minerals (namely, calcium: 40–100 mg, magnesium: 70–90 mg, potassium:1056 mg, phosphorus: 20–90 mg, sodium: 19–30 mg, iron: 10–13 mg, manganese:0.2–0.5 mg, zinc: 0.2–0.4 mg, copper: 0.1–0.9 mg, and chloride: 5.3 mg per 100 g of Jaggery), vitamins (namely, vitamin A: 3.8 mg, vitamin B1: 0.01 mg, vitamin B2: 0.06 mg, vitamin B5: 0.01 mg, vitamin B6: 0.01 mg, vitamin C: 7.00 mg, vitamin D2: 6.50 mg, vitamin E1: 11.30 mg, and vitamin PP: 7.00 mg), and protein: 280 mg per 100 g of Jaggery. The other form of Jaggery is also called as Gur which is high calorie sweetener and contains minerals, protein, glucose, and fructose and is healthier in intake when compared with white sugar. The good quality Gur contain more than 70% sucrose, less than 10% of glucose and fructose and 5% minerals, 3% moisture, (Aanad. P. shahu 1994; Aanad. P. shahu 1994).

Material and methods

Procurement of materials for Oats Burfi incorporated with Jaggery

Raw materials required during present investigation were procured from local market of Saralgaon such oats, Jaggery, peanut, coconut, cardamom, ghee, almond etc. the raw material were cleaned and made free foreign matters.

Physical Properties of oats Burfi incorporated with Jaggery

The colour of ingredients and product was determined by visual observation. The shape of the product was determined by visual observation and dimeter observed by vernier calliper.

Chemical Properties of Oats Burfi incorporated with Jaggery

Different chemical properties of samples were analysed such as moisture content, ash, fat, protein and total carbohydrate. All the determinations were done in triplicate and the results were expressed as the average value. For moisture determination samples were dried in oven at 130ºC for 60 minutes. For ash determination samples were placed in muffled furnace at 550ºC to burn out all carbon compounds leaving in organic part (ash). Fat was determined by fat extraction unit by using n. Hexane and protein determined by soxhlet's apparatus.

Sensory Evaluation of Oats Burfi incorporated with Jaggery

Prepared product was evaluated for sensory characteristics in terms of appearance, color, flavour, aftertaste, texture and overall acceptability by 10 semi-trained panel members comprised of academic staff members using 9- point Hedonic scale. Judgments were made through rating the product on a 9 point Hedonic scale with corresponding descriptive terms ranging from 9 'like extremely' to 1 'dislike extremely'. The obtained results were recorded in sensory score card.

Storage Study of Oats Burfi incorporated with Jaggery

Storage of Oats Burfi incorporated with Jaggery was done at two different condition *viz*., ambient storage (30˚C) for a 10 to 15 days and cool storage (4 ˚C) for a period of 30 days.

Statistical analysis of Oats Burfi incorporated with Jaggery

The analysis of variance of the data obtained was done by using Completely Randomized Design (CRD) for different treatments as per the method given by Panse and Sukhatme (1967). The analysis of variance revealed at significance of $P<0.05$ level S.E. and C.D. at 5per cent level is mentioned wherever required.

Formulation of Oats Burfi incorporated with Jaggery

For preparation of Oats burfi different formulations were made such as T_1, T_2 and T_3. Oat's burfi were prepared by using various ingredients such as Ghee, coconut, peanut were used at 5% each and Cardamom and almond were used at 2%, 3% respectively. Oats use for, T0, T1, T2, T3, are 00gm, 50gm, 60gm, 70gm respectively and Jaggery used for treatment T0, T1, T2, T3 are 00gm, 40gm, 30gm, 20gm respectively. According to the sensory evaluation of trained panel member given highest score and good acceptance to the sample T1. Sample T1 used for the further study.

Preparation of Oats Burfi incorporated with Jaggery

Flowsheet for Preparation of Oats Burfi incorporated with Jaggery

Collection of ingredients
↓
Cleaning the raw material to remove foreign material
↓
Weighing all raw ingredients
↓
Fry the oats in ghee in Pan
↓
Remove the fried oats in separate plate
↓
Roast the peanut
↓
Grinding the peanut
↓
Mix oats, grind peanut and cardamom
↓
Take Jaggery in pan and add water to mix it
↓
Mix all ingredients with Jaggery syrup
↓
Mix Properly
↓
Waxing the plate with help of ghee
↓
Pour all mixture in plate
↓
Cutting in to small pieces
↓
Packaging

Results and discussion

Physical Properties of Oats Burfi incorporated with Jaggery

Table 1: Physical Properties of Oats Burfi incorporated with Jaggery

Parameter	Observation
Color	Light Brown
Thickness	0.5cm
length	5cm
weight	5 g

Color of the Burfi was determined by the visual observation; the color of Oats Burfi is Light brown. Thickness of the Burfi was measure by the vernier calliper; thickness of the Burfi is 0.5cm. Length of the Burfi was measure by the vernier calliper; length of the Burfi is 5cm. weight of the Burfi was measure by the weighing balance; weight of burfi is 5g respectively.

Chemical Properties of Oats Burfi incorporated with Jaggery

Table 2: Chemical Properties of Oats Burfi incorporated with Jaggery (Selected Sample T_1)

Parameters	Sample (T_1)
Moisture	18.05%
Ash	4.3%
Carbohydrate	40.80%
Total fat	20%
Protein	14.92%
Energy value	290 kcal

The Proximate analysis of Oats burfi incorporated with Jaggery such as moisture, fat, protein, and ash was carried out and the results obtained were tabulated in that, Ash content 4.3%, fat content 20%, protein content 14.92% and carbohydrate content was found to be 40.80%. Energy values was found to be 290 Kcal respectively. Chemical properties shown that Oats Jaggery Burfi contain high amount of protein contain.

Sensory evaluation of Oats Burfi incorporated with Jaggery

Table 3: Sensory Evaluation of Oats burfi with Jaggery

Sample	Colour	Flavour	Taste	Texture	Appearance	Overall Acceptability
T0	7	7	8	7	7	7.2
T1	9	8	9	8	8	8.4
T2	7	6	7	7	7	6.8
T3	7	7	8	6	7	7

Prepared Oats burfi with Jaggery were evaluated for sensory characteristics in terms of Colour, Flavour, Taste, Texture, Appearance and overall acceptability by 10 semi-trained panel members comprised of academic staff members of the College of Food Technology, Saralgaon, using 9-point Hedonic scale. Judgments were made through rating the product on a 9-point Hedonic scale with corresponding descriptive terms ranging from 9 'like extremely' to 1 'dislike extremely'. The obtained results were recorded in sensory score card.

Oats burfi with Jaggery sensory evaluation concludes that sample T1 has highest score as compare to the other samples. The Colour of T1 sample as per the table is 9 point while samples T0 (7), T2 (7), T3 (7). The Flavour of sample T21 was acceptable with 8 while samples T0 (7), T2 (6), T3 (7). The Texture of sample T1 was selected by 9 points while other samples points are T0 (8), T2 (7), T3 (8). The Appearance of sample T1 was selected by 8 while other samples points are T0 (7), T2 (7), T3 (7). The Taste of sample T1 was selected by 9 points while other sample are T0 (8), T2 (7), T3 (8). The overall acceptability of sample T1 was selected by 8.4 points while other samples points are T0 (7.2), T2 (6.8), T3 (7).

Conclusion

Conclusively, it emerges that the Burfi can be prepared was carried out successfully prepared by using Oats, Jaggery and other ingredients. The health benefit of Oats and Jaggery is well known so the product is having nutritional values. This type of value addition by way of nutrient enrichment does certainly help to provide good source of energy. After consuming the product it can satisfy the nutritional needs of the consumer.

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