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Development and evaluation of popped sorghum burfi

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Abstract

The present study was undertaken with an objective to develop ready to eat convenience products by utilizing popped sorghum i.e ready to eat burfi by using indigenous local variety 'Aralu jola'. Sorghum grains were pre-treated, popped and milled to coarse flour and burfi was developed. Further, the developed burfi was assessed for its sensory quality and proximate composition and compared with control sample which was prepared by traditional method. *i.e*, burfi by using jowar flour without popping. Results revealed that, nutrient content specially protein and crude fibre of sorghum ready to eat burfi was higher compared to control sample. However, the product was well accepted in sensory quality assessment, hence this product can be the way to add value to sorghum and may be healthy and nutricious product for children.

Keywords: Sorghum, sensory quality, convenience foods, popping, laddu

Introduction

Jowar/sorghum is one of the most important cereal crop. About 50 percent of the total area under jowar cultivation of india is in Maharashtra, Karnataka, Andhra Pradesh and Tamilnadu. Jowar is considered as staple food of North Karnataka (Chavan *et al.* 2017) [1]. Especially those from farming community consume jowar in various forms. The most common products are breads, porridges, boiled grains and steam cooked products such as kucchu kadubu, methi kadubu, sweet kadubu *etc*., These kadubus are prepared as special dish during Ganesh chaturthi in Karnataka. Sorghum is also used in the preparation of several snacks and for popping, chewing, and malting. This crop grows well with less water and even in barren land or less fertile land. There are many versatile and indigenous varieties of sorghum found in North karnataka region. Sorghum products are deficient in essential amino acids such as lysine, methionine, tryptophan and the presence of anti-nutritional factors such as tannins and phytates limit their nutritional value. Sorghum has some limitations, due to the presence of anti-nutritional factors, such as trypsin and amylase inhibitors, phytic acid, and tannins. These compounds are known to interfere with protein, carbohydrates and mineral metabolism. Processing techniques such as fermentation, popping, malting and dehulling techniques have been used to improve nutritional value of ready to eat products (Dhadke *et al.* 2022) [2]. Aralu jola is one of the locally grown (Village-Nagaral under Raichur district of Karnataka) indigenous variety named as Nagaral Dundu jola. Perfect variety for popping which is used more during 'nagapanchami' a traditional festival of Karnataka for the preparation of aralu chuda and laddu. Popped grains mixed with oil and spice or sweetened are popular snack foods. It can also be used in weaning food formulations and as ready-to-eat products (Mishra *et al.* 2014) [4]. Nutritional quality of sorghum can be enhanced by popping. It is a traditional and low cost process which improves taste, digestibility and shelf-life. Popping sorghum is a low-cost method for producing flour with better starch properties, and it provides an untapped possibility for developing unique and healthier cereal-based food items.

In Karnataka during 'nagapanchami' festival, milk is poured over Naga idols and popped sorghum is used as 'akshate'. Popped sorghum laddu is a traditional sweet prepared during festival time and even at the time of fasting, as it provides good nutrition with small portion. Popping process improves bioavailability of minerals especially iron and improves digestibility of both carbohydrates and protein as it converts complex carbohydrates to simple sugars. Moreover, popping reduces anti nutritional factors. The sorghum puffs are white in colour and are crispy in nature, similar to the puffed rice. The shelf life is for 4 months when packed in air tight pouches at ambient temperatures (Dayakar Rao *et al.* 2016) [5]. Different popping methods can be applied i.e., There are several techniques of popping/puffing employed, including dry heat application,

moist heat application by using oil as media, hot air popping, gun puffing and even microwave method. Different procedures produce different quality in popping. There is a growing consumer interest in ready-to-eat foods mainly due to their convenience, wide vailability, appearance, taste and texture (Mary *et al.* 2014) [3]. To cater the needs there is a need to develop nutritidense and ready to eat products. Popped sorghum flour was made and can be utilized for different dishes like burfi, laddu (Aralittina unde), weaning food etc., In the present study a sweet dish 'burfi', was developed by utilizing this popped sorghum flour

Material and Methods

Raw material

Popped sorghum was procured from farmers field at Nagaral village in Raichur District of Karnataka. Other ingredients *viz.*, milk, coconut, sugar, ghee was purchased from local market.

Methods

Preparation of popped soghum flour

Popped sorghum (Aralu jola) which is grown locally by less number of farmers were collected, cleaned and used for popping. Pre processing like blanching was done to sorghum grains for 2 min and drained. These were spread on cotton cloth just to absorb water content on grains. These were popped on highly heated, thick bottomed tava/pan. Popped grains were ground coarsely and used in the preparation of burfi

Preparation of Burfi

Table 1: Composition of the RTE Popped sorghum burfi (For 100 g)

Ingredients	Quantity (g)
Popped sorgum (Flour form)	20
Bengalgram flour	5
Milk	15
Sugar	30
Oil	15
Ghee	5
Grated raw coconut	10

Mix all the ingredients in thick bottomed pan

↓

Cook in low flame with constant stirring

↓

Cook till it leaves the bottom and forms porous texture

↓

Transfer this mix to ghee greased plate

↓

Allow to cool and cut in to pieces

This burfi was assessed for its sensory quality and compared with burfi prepared by sorghum flour which was not popped by panel of judges and proximate analysis was done for both the samples at NABL accraidated lab, UAS Raichur.

Table 2: Sensory evaluation of popped sorghum burfi

Product	Appearance	Texture/ Consistency	Aroma/ Smell	Taste/ Flavor	Overall acceptability
RTE Popped sorghum burfi(PSB)	8	9	9	9	9
RTE Sorghum burfi (SB)	7	8	7	8	8

It is noticed from the table-2 that popped sorghum burfi was extremely liked for its texture, aroma, taste and overall acceptability compared to control sample. However appearance of developed burfi(PSB) scored 8 (Liked very much) which is better than control sample(SB). Popping imparts acceptable taste and desirable aroma to the product 9 (Mishra *et al*., 2014) [4]. Appearance and aroma score of PSB was high may be because off white colour of grains and popping effect.

Table 3: Nutrient composition of the RTE Popped sorghum burfi (100gm)

Product	Moisture (%)	Carbohydrate (g)	Protein (g)	Crude Fat (g)	Crude fibre(g)	Total ash (g)
Popped sorghum burfi(PSB)	4.08	56.24	8.00	26.07	2.05	0.61
Sorghum burfi (SB)	4.09	49.29	4.08	25.37	0.74	0.70

It is inferred from the Table-3 that, RTE popped sorghum burfi contains 4.08 percent of moisture which determines shelf life of the product. Lower the moisture content longer the shelf life. This is on par with control product which is prepared from sorghum without popping. 56.24 g and 49.29g of carbohydrate was found in popped sorghum burfi and sorghum burfi respectively. Popping also improves the digestibility of starch as it involves gelatinization of starch and degradation of dietary fibres (Mishra *et al*., 2014) [4]. Higher percent of protein was noticed in PSB (8.00 g) compared to SB(4.08 g). Popping process improves protein content. Further, it was cleared that both the samples contains high amount of crude fat which may be due to use of oil, ghee and fresh coconut. Least percent (0.61% and 0.70%) of ash and crude fibre (2.05 g and 0.74g)) was found in popped sorghum burfi and Sorghum burfi respectively.

Conclusion

Popped sorghum burfi contains higher amount of protein compared to sorghum burfi. This may be because of popping, which increase protein content. Further PSB was accepted by the panel of judges and advised to take this product for school going children as this product provides high energy, quality protein and easily digestible. However novel and healthy sorghum products expands the usage of sorghum in regular diet and opens new avenues in small scale food industries.

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