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Development and Quality Evaluation of Puffed Cereal Bar

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ABSTRACT

The consumption of cereal bars has increased mainly among young consumers puffed cereal bar using Popped sorghum, popped Amaranth, Chickpea seed and cornflakes are main ingredients in our cereal bar. Three samples were prepared by using different composition of chocolate and gulkand. On the basis of sensory analysis sample 3 was decided to take for mass production. Sample three contains 1.12 % ash. The moisture content was 3.6%, The fat content was 5.1%., The protein content was 3.32%. The carbohydrates content was 77.86% and crude fibre was 9%. The energy content of Puffed cereal bar was determined. The energy value was 369.6kcal. Developed process for the preparation of high energy high fibre puffed cereal bar was simple and feasible and contributes for the health benefits to all the age groups.

Key words: *puffed cereal, Sorghum, Chickpea seed, Cornflakes, Carbohydrates*

INTRODUCTION

Cereal based snack bars are small rectangular nutritional food bars having a weight 25-50g and prepared from multiple ingredients including cereals, fruits, nuts, sugar, etc. Several types of cereal based snack bars exist, including high-protein, high-fibre and high-calorie bars. Now-a-days nutritional bars have become popular. The bars offer a fast, convenient food source that requires little preparation, a long shelf life and no refrigeration. It has carbohydrates, protein, fat, fiber, nutraceuticals, preservatives and some functional additives for normal or special diets. Snack bars are one of the ready-to-eat convenient products occupying larger space in the consumer market which not only satisfy the hunger, but prove as a qualitative source of nutrients and are a convenient means of replacement of a meal. According to Roberfroid[31], one of the major challenges is to provide busy consumers with healthy ready-to-eat foods. Countries like India are facing, among others, three challenges first is to control the cost of health care; to offer a good nutritious meal and promote better and healthy living; and to provide more and more "busy" consumers, a choice of healthy processed or ready-to-eat foods. Cereal based snack bars are formulated due to the necessity of having a product combining easiness and nutritional quality, in order to either improve or substitute snacks between meals, to complement meals, or simply gain energy in a healthy way.

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The consumption of cereal bars has increased mainly among young consumers. Young children or school going children are more likely to consume such snack bar. Ready-to-eat (RTE) cereals are processed grain formulation suitable for human consumption without requiring further processing or cooking. Popped sorghum is a very popular, traditional snack food in central India. 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. Amaranth grain *(Amaranthus cruentus*) is a pseudo cereal consumed in various parts of the world with potential as a source of dietary nutrients.

Per 100g of Sorghum contains 10.4 g of Protein, 3.1g of fat , 1.6g of ash , 2.0g of fibre, 70.7g Carbohydrate, 25mg of Calcium, 504mg Iron. (Millet Grains: Nutritional Quality, Processing, and Potential Health Benefits). Amaranth grain is a good source of protein and vitamins and therefore is used largely for feeding children and the elderly. Although it can be used to alleviate malnutrition, its processing and nutritional characteristics are not well established. In India, *A. Hypochondriacus L.* is known as "rajgeera" (the King's grain) and is often popped to be used in confections called "laddoos. Per 100g of Amaranth grain 13.56g of Protein, 7.02g Fat, 2.8g Ash, 6.7g Total dietary fiber, 7.61mg of Iron, 159mg of Calcium, 557 mg Phosphorus, 508 mg Potassium, 2.87mg Zinc and 1.19mg of Vitamin E (alpha- tocopherol). (State of Knowledge on Amaranth Grain: A Comprehensive Review) Cornflakes are food products from sweet corn (Maize) by rolling and toasting cooked corn mixed with sugar and vitamins. They feature prominently in our breakfast menu as a breakfast cereal, served with milk. Chickpea seed is an important and cheap source of legume protein which can be used as a substitute for animal protein because their supply is limited and expensive. It is a good source of energy, protein, minerals, vitamins, fibre and also contains potentially health- beneficial phytochemicals. Chickpea has significant amounts of all the essential amino acids except sulphur-containing amino acids, which can be complemented by adding cereals to the daily diet. By considering consumption of cereal bars among young consumers we decided to make puffed cereal bar using Popped sorghum, popped Amaranth, Chickpea seed and cornflakes as main ingredients in our cereal bar.

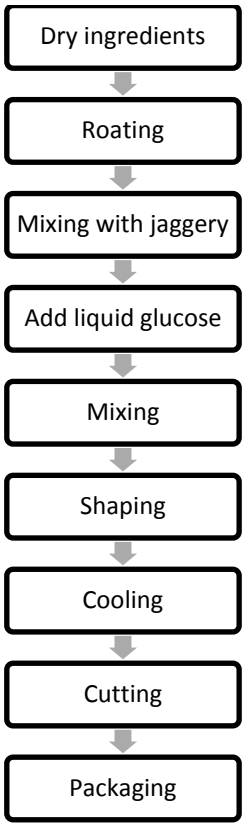
MATERIAL AND METHODS

For the preparation of Puffed Cereal Bar the required raw material such as Popped Sorghum, Groundnuts, Popped amaranth seeds (rajgira), Roasted split chickpea, Dark chocolate, Gulkand, Cornflakes, Liquid glucose and Jaggery is made available from Nashik local market. These raw materials are easily available in low cost. The required packaging material was also purchased from local market. Firstly, the dry ingredients raw material was weighted separately. Then the weighted ingredients were roasted at 35-40°C approximately, until they become crispy (here moisture from the raw a material were removed.) The each ingredient was added separately to the hot pan, containing the melted jaggery in order to get respective layers. The jaggery was melted at about 80°C The above procedure was repeated in order to obtain the 3-4 layers respectively. Furthermore, the mass was put on aluminium trays, greased with butter or cover with butter paper. Then the mass was cooled at the room temperature After cooling, the bar were cut into required size and shape (rectangular shape, size The cut bars were wrapped with butter paper in the aluminium bags and the sealed airtight. Three samples were made by varying chocolate, gulkand proportions so as to make easy to know characteristics of final product. After taking sensory analysis of 3 samples we decided to finalize the proportion of **sample 3** and production was carried out.

Table No 1: Formulation of product

Sr. No.	Ingredients	Sample 1	Sample 2	Sample 3
1.	Popped sorghum	7 gm	7 gm	5 gm
2.	Popped amaranth seed	7 gm	7 gm	7 gm
3.	Groundnut	8 gm	8 gm	8 gm
4.	Roasted split chickpea	3 gm	3 gm	2 gm
5.	**Dark chocolate**	**7 gm**	**-**	**5 gm**
6.	Corn flakes	8 gm	8 gm	8 gm
7.	**Gulkand**	**-**	**7 gm**	**5 gm**
8.	Jaggery	38 gm	38 gm	38 gm
9.	Liquid glucose	27 gm	27 gm	27 gm

PROCESS FLOW CHART



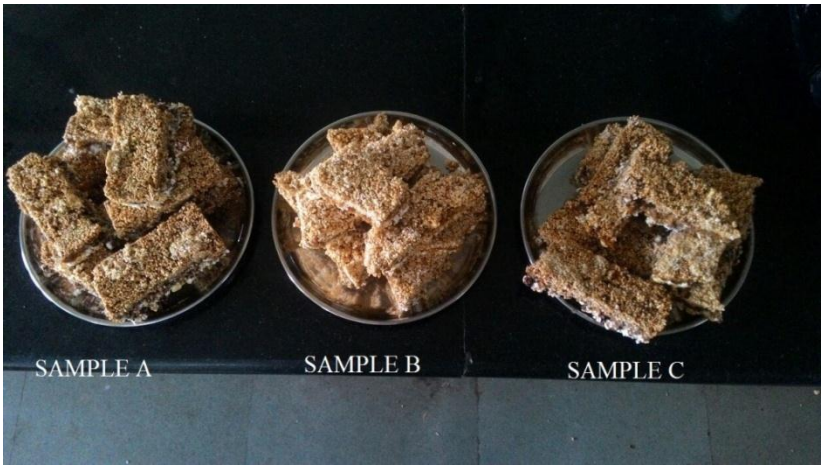


Fig. 1: Puffed cereal bar

SENSORY ANALYSIS:

The puffed cereal bar were developed with different combinations of chocolate and gulkand was analysed for sensory analysis. Average sensory analysis data analysed by 9 point hedonic scale is shown by graph and table given below.

Table No 2: Average of Sensory analysis data

Sample	Organoleptic Score					
	Colour	Flavour	Texture	Taste	Mouth feel	Overall Accept-ability
Sample 1	7.5	7.2	7.3	7.3	7.2	7.6
Sample 2	7.8	7.5	7.5	8.2	7.5	8.1
Sample 3	8	7.8	7.6	8	7.5	8.5

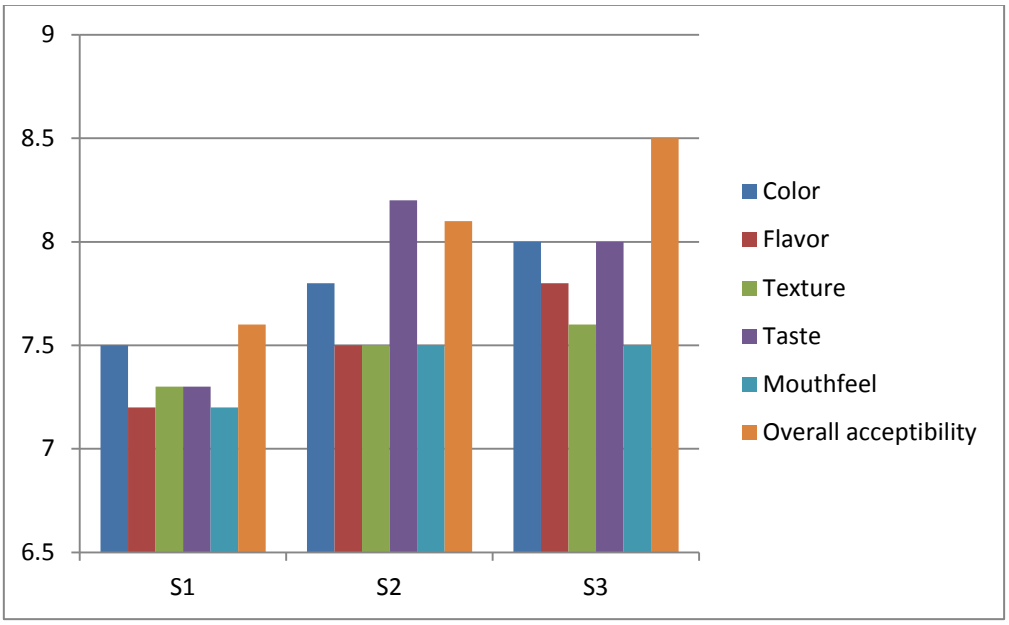


Fig. 2: Sensory analysis

RESULT AND DISCUSSION

The most accepted sample of Puffed cereal bar i.e. (Sample 3) was subjected to chemical and microbial analysis. The results obtained are presented in Table below. The ash content of Puffed cereal bar was determined by Ranganna method[29]. The ash content was 1.12 per cent. The moisture content of Puffed cereal bar was determined by Ranganna method[29] and A.O.A.C[1]. The moisture content was 3.6 per cent. The fat content of Puffed cereal bar was determined by Ranganna method[29]. The fat content was 5.1 per cent. The protein content of Puffed cereal bar was determined by Ranganna method[29]. The protein content was 3.32 per cent. The carbohydrates content of Puffed cereal bar was determined by Differential methods. The carbohydrates content was 77.86 per cent. The crude fibre of Puffed cereal bar was determined by A.O.A.C. method[1]. The crude fibre was 9 per cent. The energy content of Puffed cereal bar was determined. The energy value was 369.6kcal.

Table No 3: Result of chemical analysis

Sr. no.	Particulars	Value (per 100gm)
1	Energy value (Kcal)	386.6
2	Protein (g)	3.32
3	Carbohydrates (g)	77.86
4	Fats (g)	5.1
5	Ash (%)	1.12
6	Moisture (%)	3.6

CONCLUSION

Cereal bar is a dietary supplement often consumed by athletes or other physically active people to maintain their calorific needs in light of their strenuous physical activity. As the name indicates, cereal bars are mainly a source of food energy, primarily complex carbohydrates, protein, fat as well as vitamins and minerals. Modern world is turning towards to the ready to eat products. People working outside their homes are more dependent on snacks for the supply of part of their daily nutritional requirements. So, puffed cereal bar can be considered as a convenience source which offers perfect nutrients and functional ingredients. Due to growing consumer demand for healthy, natural and convenient foods, attempt is being made to prepare the puffed cereal bar. This cereal bar is prepared from a unique standardized process which is easily prepared and time consumable. This cereal bar helps in prevention of diabetes and cardiovascular disease, also controls blood sugar level, it stimulates immune system and nervous system as well. As it is a gluten free bar, it is readily digestible, thus, it prevents obesity. The puffed cereal bar were prepared with various combination such as S1 (puffed cereal bar with dark chocolate), S2 (puffed cereal bar with gulkand) and S3 (puffed cereal bar with both chocolate and gulkand). It is seen that the organoleptic score of the puffed cereal prepared with the combination of both dark chocolate and gulkand was highest, i.e. 8.5, followed by sample S2 and S1. The shelf life of product was analyzed for bacterial count using Total Plate Count Technique on zero, 3rd, 6th, 9th, 12th and 15th day of storage. Hence, the developed process for the preparation of high energy high fibre puffed cereal bar was simple and feasible and contributes for the health benefits to all the age groups.

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