



## Studies on preparation and quality evaluation RTE (Ready-to-Eat) Bajra choco flakes

Ranjeet Chunilal Kokani<sup>1</sup>, Sanket Argade<sup>2</sup>

<sup>1</sup> Principal, Department of Food Process Technology, College of Food Technology, Saralgaon Tq. Murbad Dist. Thane, Affiliated to Dr.B.S.K.K.V. Dapoli, Maharashtra, India

<sup>2</sup> Department of Food Process Technology, College of Food Technology, Saralgaon Tq. Murbad Dist. Thane, Affiliated to Dr.B.S.K.K.V. Dapoli, Maharashtra, India

### Abstract

Study aimed at the standardization and preparation Ready-to-eat (RTE) breakfast Bajra choco flakes were processed and formulations suitable for human consumption. Flakes formulated from blends of 30%, 35% and 40% bajra flour and other ingredients. bajra used due to its unique nutritional properties. Flakes are made primarily from Bajra flour, Almond powder, Suji, Milk powder etc. in about that order of the quantities produced, usually with added flavor and fortifying ingredients. The flakes were evaluated for their organoleptic acceptability, nutritional composition and functional properties. The results of the sensory evaluation showed that the (40% Bajra flour) T3 sample selected and acceptance in all the appearance, colour, flavour, aftertaste, texture and overall acceptability parameter. Sensory evaluation done through 9 point hedonic scale and sample T3 selected for the further study. Prepared sample physiochemical properties observed that The physical properties of Bajra choco flakes observed that 1000 flakes weight  $15.43 \pm 1.09$ g, 1000 flakes volume (ml)  $9.33 \pm 1.04$ , Bulk density  $0.43 \pm 0.05$ , Length (mm/inch)  $4.05 \pm 0.52$ , Breadth (mm/inch)  $3.49 \pm 0.48$ , Thickness (mm/inch)  $0.67 \pm 0.18$  respectively and Chemical properties of Bajra Choco flakes analyzed that Ash- $1 \pm 0.05$ , Moisture- $3.2 \pm 0.05$ , Energy-579.6 Kcal, Fat- $29 \pm 0.06$ , CHO- $71.05 \pm 0.02$  and Protein- $8.6 \pm 0.03$  respectively. All the vales determined by AOAC methods. Flakes were relatively shelf-stable, lightweight, and convenient to ship and store. The original hot cereals required cooking in the home before they were ready for consumption, but flakes prepared ready for consumption with the addition of either hot water or milk to the cereal in the bowl. Consumer given more acceptance to the product.

**Keywords:** Ready- to-eat, blends, sensory evaluation, physiochemical properties, store etc

### Introduction

RTE cereals originated in the United States in the latter part of the 19th century. At first developed and used as healthful vegetarian foods in a clinical context, they soon caught on with the general population, and an entire industry was thereby spawned. Their processing typically involves first cooking the grain with flavor materials and sweeteners. Sometimes the more heat-stable nutritional fortifying agents are added before cooking. Two general cooking methods are employed in the industry—direct steam injection into the grain mass in rotating batch vessels and continuous extrusion cooking. Breakfast cereal (or just cereal) is a food made from processed grains that is often eaten as the first meal of the day. It is often eaten cold with a spoon, usually mixed with milk, yogurt, and sometimes fruit, but may be eaten dry. Cereals are often fortified with vitamins. A significant proportion of cereals are made with high sugar content. Many breakfast cereals are produced via extrusion. Breakfast cereals are a healthy choice for breakfast. The breakfast cereal and oat milling industry provides a large number of varieties of breakfast cereals stretching from traditional breakfast cereals to oat flakes and the different types of mueslis. Breakfast cereals [8] can play an important role in improving the diets and nutritional status of children. Breakfast cereals are a food that children and adults enjoy, and hence encourage breakfast consumption. Research confirms that breakfast cereals consumers have a more substantial and varied breakfast, and more likely to meet nutritional requirements for nutrients such as vitamins, minerals and fibre than non-consumers. Breakfast cereals

make a major contribution to the diet- data shows that they are the leading source of iron in the diet. They are also a major source of B vitamins (about 20%) and provide one tenth of the fibre in the young people (Varsha Keerthi R & Pavani S, 2016) [26].

Ready-to-eat (RTE) breakfast cereals are processed grain formulations suitable for human consumption without further cooking in the home. They are relatively shelf-stable, lightweight, and convenient to ship and store. They are made primarily from corn, wheat, oats, or rice, in about that order of the quantities produced, usually with added flavor and fortifying ingredients. Hot breakfast cereals, on the other hand, are made primarily from oats or wheat; those made from corn or rice is of minor importance, being produced in relatively small quantities. The original hot cereals required cooking in the home before they were ready for consumption, but now some varieties are preprocessed so that they are ready for consumption with the addition of either hot water or milk to the cereal in the bowl. Breakfast cereal products were originally sold as milled grains of wheat and oats that required further cooking in the home prior to consumption. In this century, due to efforts to reduce the amount of in-home preparation time, breakfast cereal technology has evolved from the simple procedure of milling grains for cereal products that require cooking to the manufacturing of highly sophisticated ready-to-eat products that are convenient and quickly prepared. Breakfast cereals can be categorized into traditional (hot) cereals that require further cooking or heating before consumption and ready-to-eat (cold) cereals that can be consumed from the box or with

the addition of milk. Breakfast cereal can be modest but rich source of protein, especially in those products containing protein additives, for which the cereal products are excellent carriers. Breakfast cereals are a food that children and adults enjoy, and hence encourage breakfast consumption. Research confirms that breakfast cereals consumers have a more substantial and varied breakfast, and more likely to meet nutritional requirements for nutrients such as vitamins, minerals and fibre than non-consumers. Breakfast cereals make a major contribution to the diet-data shows that they are the leading source of iron in the diet. They are also a major source of vitamins B (about 20%) and provide one tenth of the fibre in the young people. (Varsha Keerthi R & Pavani S, 2016) [26].

Cereal grains (or simply grains) are small, hard and edible dry seeds that grow on grass-like plants called cereals. They are a staple food in most countries, and provide more food energy worldwide than any other food group, by far. Grains have played a major role in human history, and grain agriculture is one of the main advancements that fueled the development of civilization. They are eaten by humans, and also used to feed and fatten up livestock. Then grains can be processed into various different food products. Cereals form a major portion of human diet and are an important source of starch and other dietary carbohydrates (dietary fibre), which play an important role in the energy requirement and nutrient intake of human. The millets are with higher fibre content, and their protein quality and mineral composition contribute significantly to nutritional security of a large section of population residing in the millet growing areas, considered to be the most disadvantaged groups. Millets are most recognized nutritionally for being a good source of minerals magnesium, manganese and phosphorus. Research has linked magnesium to a reduced risk for heart attack and phosphorus is important for the development of body tissue and energy metabolism. Millets are also rich in phytochemicals, including phytic acid, which is believed to lower cholesterol, and phytate, which is associated with reduced cancer risk. Thus, millets are strategic in terms of their food, nutritional and livelihood security and their role in local agro-ecosystems.

Bajra (*Pennisetum glaucum*) or Pearl millet is an important nutria- cereal or coarse grain cereals suitable for rainfed and dryland agriculture. It is 70-90days duration crop best suitable for sandy, black and loamy soils with good drainage. It is mainly grown in Kharif or rainy season in the States of Rajasthan, Haryana, Uttar Pradesh, Madhya Pradesh, Gujarat, Maharashtra and Karnataka. It is also grown in summer in a few districts of Gujarat, Uttar Pradesh and Rajasthan. Bajra is consumed both as grain and used for fodder purpose. Bajra is staple diet in many States of India. The "Bajra ke Roti" is an important part of Indian cuisine in Rajasthan, Haryana and other parts of North India. With ovoid grains of 3 – 4 mm length pearl millet has the largest kernels of all varieties of millet (not including sorghum) which can be nearly white, pale yellow, brown, grey, slate blue or purple. The 1000-seed weight can be anything from 2.5 to 14 g with a mean of 8 g. The height of the plant ranges from 0.5 – 4 m.

Pearl millet/ bajra (*Pennisetum glaucum*) is the most widely grown variety among all millets in India. It is highly suitable

for cultivation in semi-arid zones. It is a highly nutritious coarse cereal grain. Bajra ranks third after rice and wheat, and is a major source of dietary energy and nutritional security for the rural population in many parts of India. It has high levels of protein with better amino acid balance than other major cereals such as rice, wheat and maize. It also has high levels of fat content, dietary fibre, and several minerals, including iron and zinc. Studies at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, have shown large availability of Iron and Zinc in Bajra i.e. iron content varying from 42 to 67 mg/kg and zinc content varying from 37 to 52 mg/kg in different cultivars. Grant Thornton India Llp (M. G. Phalphale et, al, 2021) [25].

In summary, breakfast cereals are: Typically low in fat, a good source of fibre and whole grain, taken with milk, good source of calcium, a major contributor of vitamins and minerals to the diet, low in sugar than other breakfast alternatives, nutrient dense but not energy dense, quick and easy. Protein enriched Bajara flakes is a breakfast cereal packed with high nutrients. These nutritious flakes can be mixed with milk or our choice of fruits for a better healthy diet. These breakfasts cereal can be consumed by all age groups except infants. These flakes contain Bajara that is superior to rice and wheat in nutritional terms. The Almonds seeds add the value to the Bajara flakes. Cocoa powder makes the children and elders to choose the product. These are the flakes that "balance health with diet".

Hence the present study was carried out for development of Bajara flakes enriching with protein rich Almonds.

## Materials and Methods

### Ingredients, Chemical and Equipments preparation of Bajra choco Flakes

Raw materials required during present investigation were procured from local market such as Bajara flour, Almond powder, Sugar, Suji, Milk powder, chocolate powder, Baking soda and Baking Powder etc. The raw material were cleaned and made free foreign matters. The equipments and machineries like tray dryer (for drying Bajara), domestic mixer (for grinding of raw ingredients), required in the present investigation were used, these equipments were available in the College of Food Technology, Saralgaon, Thane (MH).

### Chemical Properties of Bajra choco Flakes

Different chemical properties of samples were analysed for 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 130°C for 60 minutes. For ash determination samples were placed in muffled furnace at 550°C to burn out all carbon compounds leaving in organic part (ash). Fat was determined by fat extraction unit by using n. Hexane or ether. Protein determine by using Kjeldahl's methods.

### Sensory Evaluation of Bajra choco Flakes

Prepared product was evaluated for sensory characteristics in terms of appearance, colour, 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.

**Statistical Analysis of Bajra choco Flakes**

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  $p < 0.005$  level S.E and C.D. at 5 percent level is mentioned wherever required.

**Formulation for preparation of Bajra choco Flakes**

Flakes prepared with varying levels of Bajra flour was investigated. The formulation was made by varying level of Bajra Flour.30%, 35% and 40% used for preparation flakes and formulated them into other ingredients and prepared the flakes. Among all the formulation 40% Bajra flour sample was selected for the preparation of cookies.

**Preparation of Bajra choco Flakes**

Cleaning of raw materials for removing unwanted material. Weight the entire ingredient accurately. Then all the ingredients properly. Then add addition of water to make a dough. After that hand extrusion done and place the extruded samples in tray. Put the tray in Oven and bake at 175°C for 25 min. Let the choco cool to room temperature. Pack the product with suitable packaging material and store it in cool or ambient temperature.

**Flow Sheet for Preparation of Bajra Choco Flakes**

Mixing of ingredients → Addition of water → Make a Dough → Uniform Mixing → Hand extrusion → Baking at 175°C for 25 min → Cooking → Packaging → Storage (Cool and dry place)

**Results and Discussion**

**Physical Properties of Bajra Choco flakes**

**Table 1:** Table for Physical Properties of Bajra Choco flakes

Parameter	Observation
Colour	Brown
Shape	Circle
1000 flakes weight (g)	15.43±1.09
1000 flakes volume (ml)	9.33±1.04
Bulk density	0.43±0.05
Length (mm/inch)	4.05±0.52
Breadth (mm/inch)	3.49±0.48
Thickness (mm/inch)	0.67 ±0.18

The physical properties of Bajra choco flakes observed and tabulate in above table and measured in standard methods that 1000 flakes weight 15.43±1.09g, 1000 flakes volume (ml) 9.33±1.04, Bulk density 0.43±0.05, Length (mm/inch) 4.05±0.52, Breadth (mm/inch) 3.49±0.48, Thickness (mm/inch) 0.67 ±0.18 respectively.

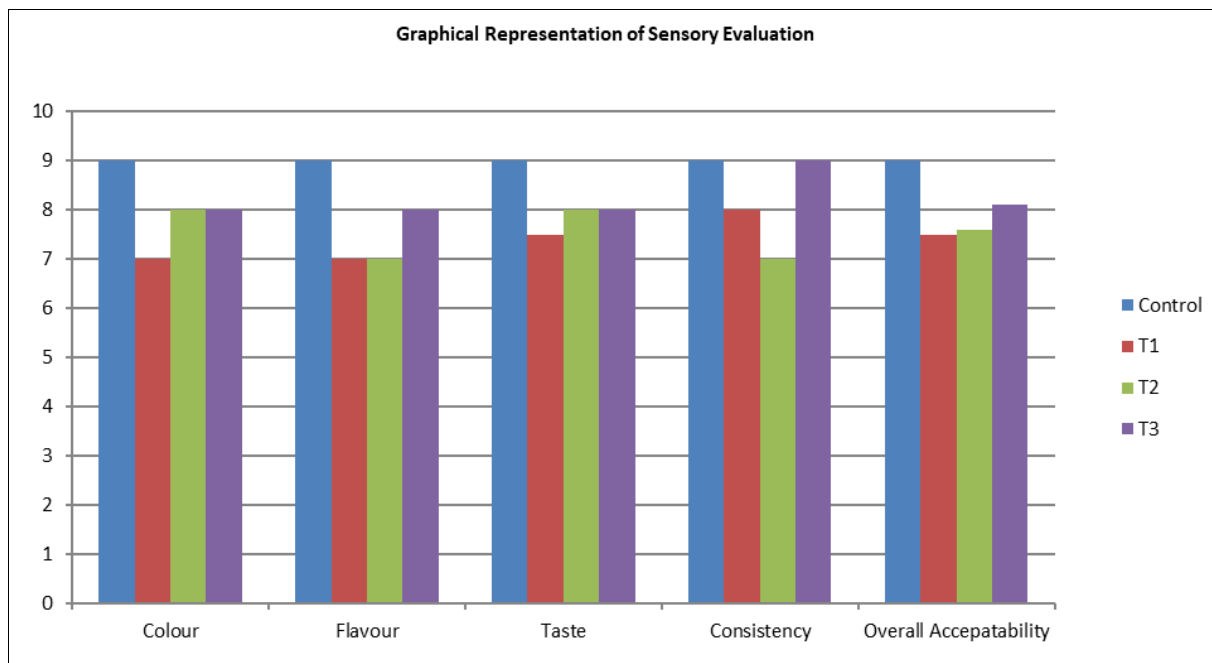
**Chemical Properties of Bajra Choco Flakes**

**Table 2:** Table for Chemical Properties of Bajra Choco flakes

Parameter	Observation
Ash	1±0.05
Moisture	3.2± 0.05
Energy	579.6 Kcal
Fat	29 ± 0.06
Carbohydrate	71.05 ± 0.02
Protein	8.6±0.03

All the Chemical properties of Bajra Choco flakes analyzed by standard methods and tabulate in above table that Ash-1±0.05, Moisture-3.2± 0.05, Energy-579.6 Kcal, Fat-29 ± 0.06, CHO-71.05 ± 0.02 and Protein-8.6±0.03 respectively. All the vales determined by AOAC methods.

**Sensory evaluation of Bajra Choco flakes**



Prepared Bajra choco flakes were evaluated for sensory characteristics in terms of colour, flavour, taste, consistency

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 likes extremely to 1 dislike extremely. The obtained results were recorded in sensory score card.

For preparation of Bajara Choco flakes various formulations were taken in that 40g of Bajara flour was selected for preparation of flakes acceptance in all the quality parameters. Formulated sample was selected through 9 point hedonic scale and all the panels are Experience College staff. In all prepared samples the T3 which gives better flavor and taste as compared to T1 and T2 which contain 30 and 35 g of Bajara Choco flakes. All the panels' gives best and good points to sample T3 than other samples. T3 gives more consistency than T1 and T2 as T3 it contains 40 g of Bajra Choco flakes. T3 Bajra Choco flakes preparation was organoleptically acceptable and used for further study. In all the parameters T3 gives best overall acceptability.

### Conclusion

Conclusively, it emerges that the Studies on Development and Quality Evaluation of Bajara Choco flakes was carried out successfully prepared by using Bajara flour and other ingredients. The health benefit of Bajara is well known so the product is having nutritional values. Bajra contains dietary energy and nutritional security. 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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