



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(12): 437-439
© 2022 TPI
www.thepharmajournal.com
Received: 20-09-2022
Accepted: 28-10-2022

Dhadke SG

Department of Food Process
Technology, College of Food
Technology, VNMKV, Parbhani,
Maharashtra, India

Pawar VS

Department of Food Process
Technology, College of Food
Technology, VNMKV, Parbhani,
Maharashtra, India

Wanole PD

Department of Food Process
Technology, College of Food
Technology, VNMKV, Parbhani,
Maharashtra, India

Formulation and nutritional evaluation of instant upma mix from popped sorghum

Dhadke SG, Pawar VS and Wanole PD

Abstract

In the present study instant upma mixes were prepared by incorporating popped sorghum flour in wheat semolina. The prepared instant upma mixes were then evaluated for proximate composition, sensory characteristics and mineral composition. The result of sensory evaluation showed that sample T₃ which has 20% wheat semolina, 60% popped sorghum flour and 20% spice mix was well accepted. The proximate composition of instant upma mixes showed that moisture varied from 7.14±0.05 to 5.12±0.1, fat 6.04±0.01 to 4.95±0.1, protein 10.30±0.1 to 11.52±0.3, ash 3.74±0.08 to 3.22±0.03, crude fiber 1.81±0.06 to 1.62±0.1 and carbohydrate from 70.82±0.06 to 73.36±0.4. The mineral result revealed that the selected sample has zinc 1.245, magnesium 0.789, iron 7.548, and copper 0.383 mg/100 g which was higher compared to the control sample.

Keywords: Instant upma mix, proximate composition, sensory evaluation, mineral content, popped sorghum

Introduction

Upma is a traditional Indian breakfast dish prepared from dry roasted semolina and served as a thick porridge. Various flavours and vegetables are commonly added when cooking, according to personal preferences. Indigenous instant food items have been prepared at home for ages, but this has altered with the advent of a wide range of rapid food products in recent years. (Unika and Jaffar 2014)^[11].

"Instant food" refers to meals that are easy, handy, and quick to make and enjoy. (Lily, 2014)^[7]. Foods that require little to no preparation or cooking before consumption are referred to as convenience foods since they make eating easier for the consumer. Increased mixes and ready-to-eat meals have been developed as a result of rapid urbanisation, the industrialised phenomenon of "working women" in recent years, and changes in consumer eating habits that followed Rodge *et al.* (2018)^[9].

Sorghum's nutritional profile resembles that of wheat and rice in a number of ways. In addition to starch and non-starchy polysaccharides with special characteristics, the grains contain a lot of fibre. Sorghum has a wide range of protein, lysine, lipids, carbohydrates, fibre, calcium, phosphorus, iron, thiamine, and niacin values. Chavan *et al.* (2009)^[4]; Shobha *et al.* (2008)^[10]. Compared to many grains and millets, sorghum has a greater protein level and essential amino acid composition. In general, sorghum has a lot of fibre and B-complex vitamins (Gopalan *et al.*, 2000)^[5].

The process of popping grains maintains their natural nutritional profile while also significantly boosting their iron bioavailability, protein digestibility, and dietary fibre content. Some of the anti-nutrients that popping also reduces include phytate, phosphate, and tannin. Popped sorghum may provide health benefits, including a lower risk of heart disease and numerous cancers, because to its high fibre and antioxidant content. (Reddy *et al.* 1991)^[8].

Material and Methods

Food commodities: A local variety of sorghum (*Dagdi*) and all the spices like green chillies, onion, mustard, curry leaves and black gram were procured from the local market of parbhani, Maharashtra.

Preparation of popped sorghum flour: Firstly the sorghum grains were soaked in hot water for 3 min then these grains were tied in the cloth for 6 hrs. After that grains were allowed in popping machine which pops the grain. Then the popped sorghum was ground to get the usual texture of upma and sieved through 250 mesh sieve.

Corresponding Author:

Dhadke SG

Department of Food Process
Technology, College of Food
Technology, VNMKV, Parbhani,
Maharashtra, India

Preparation and formulation of instant upma mix

For the instant upma mix all the ingredients were proceed, wheat semolina and Bengal gram was roasted on a pan for 5 to 8 min until it give an usual colour. The vegetable like green chillies and onions were dried in cabinet drier at 70 °C for 3hrs. Mustard seeds and curry leaves were fried in oil. All the ingredients including salt were cooled and mixed as per the recipe. Many trials were taken of the main ingredient and raw material to get the desired recipe of upma.

Table 1: Different formulations of instant upma mix

Sample	Wheat semolina	Popped sorghum flour	Spice mix
Control (T ₀)	80	0	20
T ₁	60	20	20
T ₂	40	60	20
T ₃	20	80	20
T ₄	0		

T₀ (control) – 80% wheat semolina + 20% spice mix

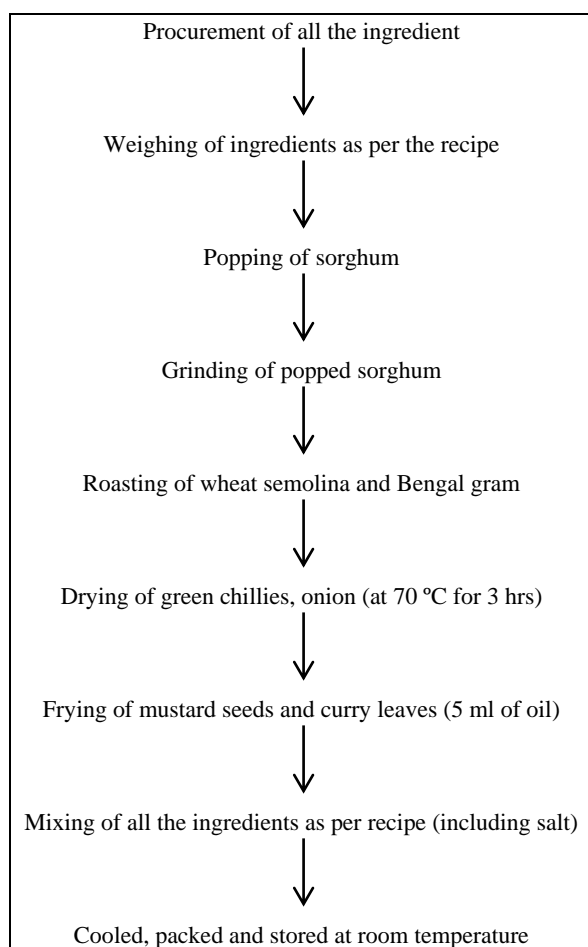
T₁ - 60% wheat semolina + 20% popped sorghum flour + 20% spice mix

T₂ - 40% wheat semolina + 40% popped sorghum flour + 20% spice mix

T₃ - 20% wheat semolina + 60% popped sorghum flour + 20% spice mix

T₄ - 80% popped sorghum flour + 20% spice mix

The 20% spice mix consist of , salt (3 g), mustard seeds (0.5 g), curry leaves (0.5 g), Bengal gram (4 g), green chillies (3 g), chopped onion (3 g), and oil (5 g).



Flowsheet 1: Preparation of instant upma mix

Preparation of upma from instant upma mix

Using specific amounts of hot water (220-250 ml), dry mixes of instant Upma mix (100 g) were reconstituted and swirled over low heat until the correct consistency was achieved (started to leave the pan).

Sensory evaluation of upma

The Instant Upma mix samples were subjected to sensory evaluations by ten semi-trained panellists, who utilised a nine-point Hedonic scale (from 1 = highly dislike to 9 = extremely like) to assess preferences for appearance and colour, taste, texture, flavour, and overall acceptability. (According to the technique described by Laura *et al.*, 2013)^[6].

Proximate analysis

Proximate analysis of raw and popped sorghum were analysed including moisture, fat, protein, carbohydrate, crude fiber, ash and mineral by the method given by AOAC, 2005^[3].

Mineral analysis

A defatted sample weighing two gram was kept at 550 °C. On a heated plate, strong hydrochloric acid (HCL) was then used to digest the resulting ash. The digested material was then filtered using Whatman No. 42 filter paper, and the final volume was made to 100 ml with distilled water. This volume was then utilised for analysis of Fe, Cu, Zn and Mn using atomic absorption spectroscopy.

Result and Discussion

Sensory evaluation of instant upma mix was carried out with the help of trained and semi trained panel members using the 9 point Hedonic scale. The mean score of different organoleptic characteristics of the instant upma mix with prepared product for the formulations are summarised in the Table 2.

Table 2: Sensory evaluation of popped sorghum based instant upma mix

Sample	Appearance	Colour	Taste	Flavour	Texture	Overall Acceptability
T ₀	7.4	7.8	7.3	7.2	7.2	7.2
T ₁	7.2	7.4	7.2	7.0	6.9	7.2
T ₂	7.6	7.2	6.6	7.3	7.3	7.3
T ₃	8.1	7.9	7.6	7.5	7.9	7.8
T ₄	7.2	7.0	7.0	7.0	7.0	6.7
SE±	0.053	0.073	0.122	0.055	0.069	0.103
CD @ 5%	0.169	0.230	0.387	0.228	0.220	0.325

Data presented in Table 2 revealed that there was significant effect of incorporation of popped sorghum flour on colour, texture and taste of upma. revealed that there was highest overall acceptability score (7.8) for the T₃ sample with compare to control. For the parameters like color, flavour and texture sample T₃ showed the highest score. While sample T₄ showed the lowest score for all the parameters with overall acceptability score (6.7).

Proximate analysis

Proximate composition helps to analyse the nutritional composition of the sample. Proximate composition of all sample was carried out and parameters like moisture, protein, fat, carbohydrate, crude fiber and ash content were evaluated. The obtained results are presented in the table 3 as below.

Table 3: Proximate composition of prepared instant upma mix

Chemical parameter %	*value/100 g				
	T ₀	T ₁	T ₂	T ₃	T ₄
Moisture	7.14±0.05	6.94±0.02	5.92±0.6	5.23±0.04	5.12±0.1
Fat	6.04±0.01	5.85±0.06	5.13±0.2	4.82±0.1	4.95±0.1
Protein	10.30±0.1	10.34±0.03	11.23±0.05	11.17±0.06	11.52±0.3
Ash	3.74±0.08	3.13±0.04	3.10±0.06	2.32±0.04	3.22±0.03
Crude fiber	1.81±0.06	1.56±0.4	1.52±0.09	1.87±0.03	1.62±0.1
carbohydrates	70.82±0.06	71.92±0.3	73.13±0.3	74.73±0.1	73.36±0.4

*Each value represents the average of three determinations

According to the data in table 3, there has been a change in the chemical composition of upma combined with popped sorghum flour. Increasing the popped sorghum flour moisture has been decreased to some extent from 7.14±0.05 to 5.12±0.1% as sorghum was exposed to high temperature (180 °C) for popping. There is slightly decrease in the fat content, for control sample the fat content was obtained 6.04±0.01% and for sample T₄ it was 4.95±0.1%. There was very slight difference found in the crude fiber, for control sample it was 1.81±0.06% and for T₄ it was found 1.62±0.1%. The obtained results are similar with the Anjitha P.K. *et al.* (2021)^[2].

The Protein content has been increased to some extent for sample T₀ it was 10.30±0.1% and for sample T₄ it was 11.52±0.3% this is due to the decrease in the phytic acid present in the sorghum which also increases protein digestibility. The result are similar with Anhelina A. *et al* (2021)^[1]. There was no significant difference obtained in ash contain for sample T₀ it was 3.84±0.08% and for sample T₄ it was recorded 3.01±0.03%. There is increased in the carbohydrate content, for the control sample the carbohydrate content was 70.8±0.06% and which was 73.64±0.4% for sample T₄. The above data reveals that the selected sample T₃ is a good source of nutrition with good amount of protein and carbohydrates.

Mineral analysis

The minerals like zinc, magnesium, iron and copper were analysed for all the samples and the obtained data is summarized in the table 4.

Table 4: Mineral composition of prepared instant upma mix

Minerals (mg/100 g)	T ₀	T ₁	T ₂	T ₃	T ₄
Zinc	0.830	0.856	0.930	1.245	1.348
Magnesium	0.412	0.496	0.645	0.789	0.796
Iron	3.950	4.132	5.176	7.548	7.668
Copper	0.310	0.289	0.323	0.338	0.324

The above data revealed that the mineral content has increased with respect to the control sample. The zinc of the control sample was 0.843 mg/100 g which was 1.314 mg/100 g for the sample T₄. The magnesium for control sample was found 0.401 mg/100 g which was increased to 0.792 for sample T₄. The iron content also increased, for sample T₀ it was found 3.948 mg/100 g which has been increased to 7.667 mg/100 g for sample T₄. The copper content was ranged between 0.305 to 0.326 mg/100 g. The above results are similar with Rajalakshmi H. (2015)^[12].

Conclusion

It can be concluded that using popped sorghum flour in the upma mix enhanced the sensory and nutritional qualities of instant upma mix. The selected sample has more protein and

carbohydrate compared to the control sample. According to the sensory score the sample T₃ which consist of 20% of wheat semolina, 60% of popped sorghum flour and 20% of spice mix has better appearance, texture and taste.

Reference

- Anhelina A, Mykolenko S, Tymchak D, Aliieva O. Effect of pop sorghum on the quality of gluten-free cereal bars. *Science Rise*. 2021;6:3-10.
- Anjitha PK, Baskaran N, Venkatachalapathy N, Tito Anand M. Nutritional Changes of Sorghum after Popping by a Developed Infrared Assisted Hot Air Popping Machine. *International Journal Current Microbiology and Applied Science*. 2021;10(01):3620-3627.
- AOAC. Official Methods of Analysis of A.O.A.C International. 18th Edition; c2005.
- Chavan UD, Patil JV, Shinde MS. Nutritional and Roti quality of sorghum genotypes Indonesian journal of agricultural science. 2009;10(2):80-87.
- Gopalan C, Ramasastri B, Balasubramanian S. Nutritive Value of Indian Foods, National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, India; c2000.
- Laura Okpala, Eric Okoli, Emelem Udensi. Physico-chemical and sensory properties of cookies made from blends of germinated pigeon pea, fermented sorghum and cocoyam flours. *Food Science and Nutrition*. 2013;1(1):8-14.
- Lilly J. Purchase decision of the consumers towards instant food products. *International Journal of Business and Administration Research Review*. 2014;2:126.
- Reddy NS, Kamble RM, Khan TNI. Evaluation of nutritional quality of maize and maize products. *Ind. J Nutr. Dietet*. 1991;98:90-94.
- Rodge SM, Bornare DT, Babar KP. Formulation and quality evaluation of instant upma mix of foxtail millet and garden cress seed. *International Journal of Chemical Studies*. 2018;6(3):1854-1857.
- Shobha V, Kasturiba B, Naik R, Yenagi N. Nutritive Value and Quality Characteristics of Sorghum Genotypes. *Karnataka Journal of Agriculture Science*. 2008;20:586-588.
- Unika D, Mohamed J. A study on consumer behaviour towards instant food products in Tamil Nadu; c2014.
- Rajalakshmi R, Arulmalar S, Usha M, Prathiba V, Kareemuddin KS, Anjana RM, *et al.* Validation of smartphone based retinal photography for diabetic retinopathy screening. *PloS one*. 2015 Sep 24;10(9):e0138285.