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Research Article

DEVELOPMENT OF MASALA BREAD AND QUALITY EVALUATION

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Abstract: Bread is an important ready-to-eat processed food. It is closely related to people's daily life. Bakery sector contribute a wide margin for innovations. An attempt has been made to improve the quality of bread by coupling with spices for gaining benefits. Garlic, onion, black pepper and coriander powders are blended together for preparation of masala mix. Formulations were made by incorporation of masala mix like; 1%, 2%, 3%, 4% and compared with control. According to sensory evaluation up to 2% fortified masala bread was acceptable. Fortification of masala mix showed textural characteristics as increase in hardness of masala bread from S0 to S4. Storage study revealed that the bread can be stored for 4 days without any additives.

Keywords: Masala mix, masala bread, sensory evaluation, texture, storage study

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Introduction

The nearly ubiquitous consumption of bread places it in a position of global importance in international nutrition. The demand has been driven by consumers seeking convenient fresh products that provide a source of nutritional value [12, 8]. Spices are a cluster of exclusive nutritive supplement that have been being used for a large number of years to upgrade the tactile nature of nourishments. A few spices have for some time been perceived to have restorative properties, for example, tonic, carminative, stomachic antispasmodic, and antihelminthic [14]. Garlic (*Allium sativum L.*), contains elevated amounts of phosphorus, potassium, sulphur and zinc and direct levels of selenium, vitamin A and C; and low levels of calcium, magnesium, sodium, iron, manganese and B-complex vitamins [2]. Garlic is yet another spice broadly considered as of late for its chemo preventive potential. Epidemiological investigations have demonstrated that higher admission of allium content is related with lessened danger of a few sorts of diseases, particularly stomach and colorectal. Garlic likewise found as antithrombotic, cancer prevention agent, immune modulator, and ant diabetic activities [7,16]. Onion (*Allium cepa L.*) is said to have stimulant, diuretic and expectorant properties and is viewed as valuable in movement of bowels. Concentrates of garlic and onions restrain platelet total and lower cholesterol levels [5]. Black pepper or its active principle piperine has been experimentally demonstrated by a number of independent investigators to possess diverse substantial effects [15]. Black pepper has been accounted for to impact lipid digestion transcendently by assembly of unsaturated fats [17]. Coriander (*Coriandrum sativum*) has been reported as a routine treatment for cholesterol and diabetes patients. It has a long history as a routine medication [4]. The essential oil and different concentrates from coriander have been appeared to have antibacterial, antidiabetic, anticancerous, antimutagenic, cancer prevention agent and free radical searching exercises [13, 18]. It is for the most part utilized as a part of gastrointestinal protestations, for example, anorexia, dyspepsia, loose bowels, complaining pain and regurgitating [9].The connection amongst nutriment and wellbeing increasingly affects nourishment development because of notoriety of the idea [6]. The expansion of the public affinity for heart and blood vessels produced the nebulous vision of the nourishment makers worry for making cell reinforcement items [11]. Now a day's bakery sector provides a wide range of opportunities for improvement. In this context an attempt was made of developing bread by utilisation of spices with their benefits.

Materials and Methods

All the raw materials such as maida, spices like onion, garlic, coriander and black pepper, compressed yeast, hydrogenated fat, food grade sodium chloride, and sugar were procured from Aurangabad local market and used in the study. All the reagents and chemicals used are of analytical grade.

Chemical analysis

The raw material was analyzed as per AACC (2000), for moisture, ash, fat, protein, gluten content, Sodium dodecyl sulphate (SDS) sedimentation value, and dietary fibre by AOAC (1990).

Colour measurement

The colour was measured in terms of lightness (L) and colour (+a: red; –a: green; +b: yellow; –b: blue) using the Hunter Lab Colour Measuring System (Colour Measuring Labscan XE system, Reston VA). A white board made from barium sulphate 100% reflectance was used as a standard. Samples were placed in the sample holder and the reflectance was auto recorded for the wavelength ranging from 360-800 nm.

Bread texture

Crumb hardness was measured using Brookfield CT3 Texture analyzer under the following conditions: sample thickness was 25 mm, load cell was 10 Kg, probe was TA11/1000.

Sensory Evaluation for bread

A panel of 10 judges using a 9-point scale carried out the sensory evaluation of bread.

Storage study of bread

Weight reduction was noted down during storage for about 4 days at room temperature.

Preparation of masala mix

Masala mix was prepared by thoroughly mixing of dry powders of garlic, onion, black pepper and coriander. The powders were prepared drying the garlic, onions and coriander in tray dryer and then grinded in fine powders respectively [10]. The mix contains higher proportion of garlic powder followed by onion, black pepper and coriander powders.

Bread making

Formulations made by replacement of maida with 0%, 1%, 2%, 3% and 4% of masala mix. The blends were prepared like S_0 = pure maida, S_1= maida + 1% masala mix, S_2 = maida+ 2% masala mix, S_3 = maida + 3% masala mix and S_4 = maida + 4% masala mix. Ingredients were weighed separately and dissolved in part of water. Yeast, sugar and salt were dissolved in part of water. Fat was added to the flour. All the ingredients were mixed in a dough mixer for 4 min at 61 rpm. Dough was fermented and temperature was maintained at 30°C at 75% relative humidity (RH) for 90 min. It was remixed, rounded and again fermented for 25 min. It was again proofed for 55 min at 30°C at 85% RH. The bread was baked for 25 min at 220°C, was cooled thoroughly, sliced and packed.

Result and Discussion

Chemical analysis of raw material

The raw material was evaluated for chemical analysis [Fig-1]. Results showed the coriander is high in fibre content. Garlic powder contains higher protein content.

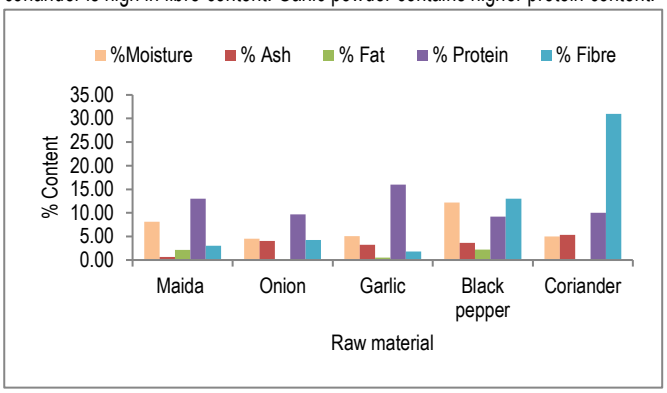

Fig-1 Chemical analysis of raw material

Colour of Masala mix

Colour values for masala mix were observed as (L) 58.12, (a) 0.58 and (b) 10.51 [Table-1].

Table-1 Colour of Masala mix

Sample	Parameters		
	L	a	b
Masala mix	58.12±0.01	0.58±0.03	10.51±0.06

Values are mean ± standard deviation of three independent determinations

Effect of masala mix on chemical properties of formulations

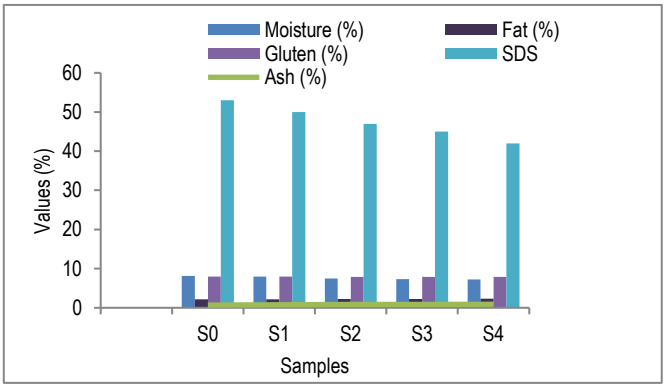

Fig-2 Effect of masala mix on chemical analysis of blends

S0 (100:0); S1 (99:1); S2 (98:2); S3 (97:3) and S4 (96:4)

The results [Fig-2] showed that moisture content was decreased from S_0 to S_4. This could be because of increase in percentage of incorporation of masala mix which is lower in moisture content. Mineral content was increasing with increasing masala mix in the blends. The increase in ash content is due replacement of pure endosperm with masala mix. The sedimentation value and gluten content shows decreasing trend. Dilution of gluten content of the flour indicates decreasing trend with increase in masala mix percentage. As the flour replaced with non flour components proportion increases the continuity of gluten structure get disrupted.

Colour analysis of masala bread

Breads were analyzed for colour values [Fig-3]. Colour for bread crust showed decreasing trend for (L) values which resembles brighter colour. This may be because of proportion of fortification of masala mix. The mix imparts its colour to the final blend. The values for (a) and (b) shows increasing trend as the proportion goes on increasing which is results in increasing redness and yellowness pigments. Baking process also responsible for colour of crust formation.

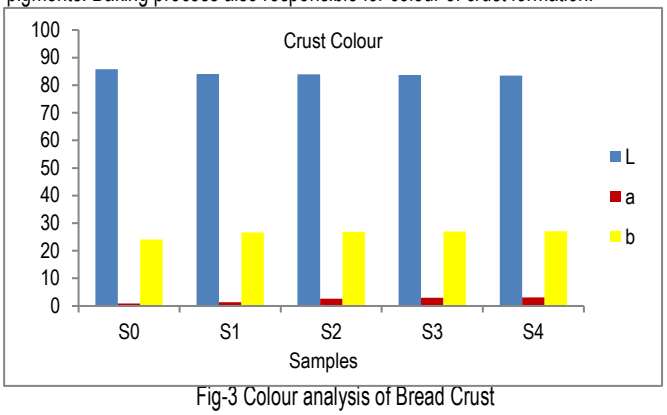

Fig-3 Colour analysis of Bread Crust

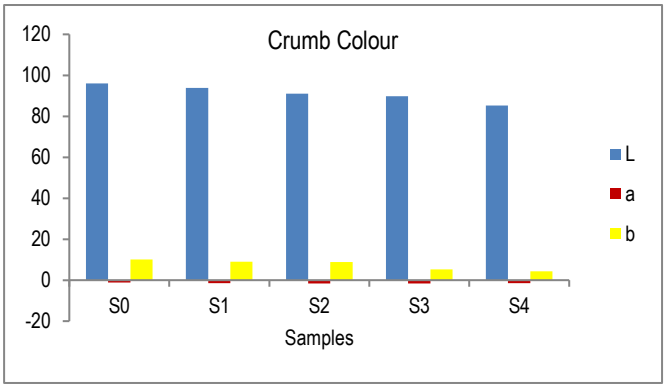

Fig-4 Colour analysis of Bread Crust

S0 (100:0); S1 (99:1); S2 (98:2); S3 (97:3) and S4 (96:4)

Fig. 4 shows the values for colour of crumb. It is observed that the values for L decreasing trend from S_0 to S_4 samples. Crumb of bread trailing its whiteness as the proportion of masala mix increases. Also (b) values also go on decreasing.

Table-2 Sensory characterisation of Bread

Parameters	Sample				
	S_0	S_1	S_2	S_3	S_4
CRUST					
Colour	8.5 ±0.00	8.5 ±0.01	8.1 ±0.00	7.5 ±0.04	7.0±0.02
Shape	8.0±0.03	7.9±0.02	7.9±0.03	7.5±0.02	7.1±0.03
Symmetry	8.0±0.02	8.0±0.01	8.0±0.02	7.9±0.00	7.5±0.04
CRUMB					
Colour	8.5±0.00	8.4±0.00	8.3±0.02	8.0±0.04	7.7±0.05
Grain	8.6±0.02	8.4±0.03	8.2±0.00	7.8±0.02	7.5±0.00
Grain score	8.6±0.03	8.4±0.05	8.2±0.07	7.8±0.00	7.5±0.02
Texture	8.8±0.04	8.5±0.05	8.3±0.00	7.9±0.06	7.7±0.07
Eating quality	8.8±0.01	8.5±0.08	8.4±0.09	7.7±0.01	7.5±0.03
Overall quality	8.8±0.05	8.5±0.00	8.4±0.02	7.8±0.04	7.5±0.00

Values are mean ± standard deviation of three independent determinations.

S0 (100:0); S1 (99:1); S2 (98:2); S3 (97:3) and S4 (96:4)

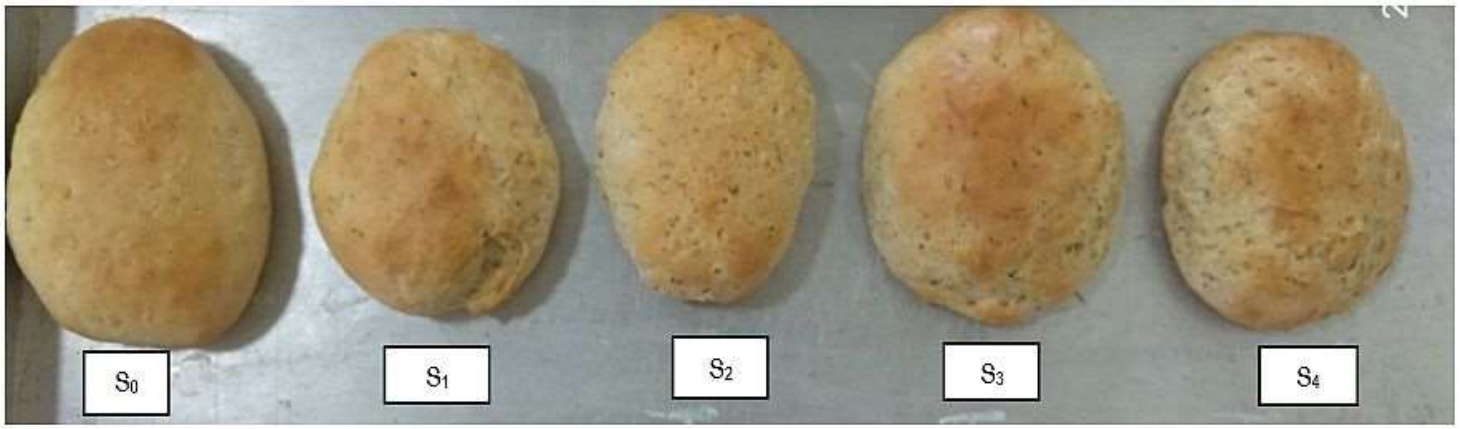

Fig-5 Photograph of Bread [S0 (100:0); S1 (99:1); S2 (98:2); S3 (97:3) and S4 (96:4)]

Sensory characteristics of masala bread

Table 2 shows the data for sensory characteristics of bread. As per results it has been seen that the sensory score for crust and crumb go on decreasing. There is slight decrease in score as compared to control sample. As per sensory panel sample S_2 is acceptable for consumption after control sample. The concentration of masala mix is acceptable up to 2% addition. S_3 and S_4 possess dominant flavour of masala mix. The change in the grain size with the addition of 3% and 4% masala mix is due to the effect of masala mix on the gas retention capacity of the dough. With regard to eating quality, breads with 1 and 2% masala mix did not possess perceptible grainy taste; bread with 3% level showed wholesome distinct taste; however, at 4% level, the distinct taste was too much, making the breads unacceptable.

Effect on bread characteristics

Addition of masala mix increases the weight of bread also increases [Table 3]. As the gluten is responsible for the light weight of bread by formation of porous structure in bread. If the flour is replaced with non gluten components it affects the quality of bread. So it has been observed the increase in weight from S_0 to S_4. Texture of bread was analysed for hardness. Values for S_0 sample was same for hardness of crumb. Fortification of masala mix shows increase in hardness value. The presence of distinct material up to a certain limit determines the texture of bread. The results show that addition of multigrains likely caused disruption of the continuity of the gluten network giving decreased elasticity and strength of the dough.

Table-3 Effect on weight and texture of the bread

Sample	Parameters		
	Weight (gm)	Texture (gm)	
		Cycle 1	Cycle 2
S_0	140.00	609	609
S_1	140.80	619	628
S_2	143.20	626	647
S_3	145.60	1080	1081
S_4	146.60	1268	1261

S0 (100:0); S1 (99:1); S2 (98:2); S3 (97:3) and S4 (96:4)

Storage study of masala bread

The bread made of S_0 and S_2 were subjected to storage study [Table 4]. The sample for storage study was selected on the basis of sensory evaluation. The breads were analysed for reduction of weight on daily basis. The evaluation carried out for 4 days. It was observed that the weight is decreasing significantly during storage. Which relaes the eating and keeping quality of bread. As weight reduces it means that the loss of moisture takes place during storage.

Table-4 Storage study of masala bread

Sample	Weight (gm)			
	Day 1	Day 2	Day 3	Day 4
S_0	12.66±0.00	11.85±0.05	10.55±0.06	9.11±0.01
S_2	13.20±0.02	12.50±0.03	11.27±0.01	10.01±0.03

Values are mean ± standard deviation of three independent determinations.
S0 (100:0) and S2 (98:2)

Conclusion

Based on the sensory results it can be concluded that maximum 2% replacement of maida with masala mix was produced the acceptable breads. Hence from the present study the use of masala mix up to the level of 2% can be considered for the production of bread with perceptible taste of masala mix.

Application of research: To develop new product having distinct taste and better economic value in market.

Research Category: Food Science, New product development

Abbreviations:
RH: Relative humidity
SDS: Sodium dodecyl sulphate
AOAC: Association of Official Analytical Chemists
AACC: American Association of Cereal Chemists

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Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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