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Influencing Millet Dehydrated Flour Substituted With Beet Root Powder On Nutritional And Quality Characteristics Of Bread

Nandhini S[1] and K.Kumarakuru[2]

[1] PG students, Department of Food science and nutrition, Nehru Arts and Science and College, Coimbatore , Tamilnadu, India -641105

[2]Assitant Professor, Department of Food science and nutrition, Nehru Arts and Science and College, Coimbatore, Tamilnadu, India -641105

Abstract:

The aim of the present study was to formulate a kodo millet dehydrated powder substituted with beet root powder incorporated in bread to act as an enhanced dietary fibre rich food by sustainable technological method with efficiency quality characteristics and better sensory attributes. The influence of kodo millet dehydrated powder concentration (10 – 30 %) replace wheat flour substituted with various concentration beet root powder was investigated on nutritional properties, physical properties, and sensory evaluation. Formulated of bread substituted with koda millet flour (20%) and beet root powder (10%) of reported the significantly higher ($p \leq 0.05$) in sensory evaluation. Nutritional value of formulated bread prepared from koda millet flour substituted with beet root powder reported higher nutritional value than the koda millet flour. Sensory attributes indicated that the koda millet flour substituted with beet root powder bread had the higher acceptability. Hence, koda millet flour substituted with beet root powdeproved acceptable not only in quality characteristics but also fulfills the demand of dietary fibre and is very palatable to ingest and will be one of the agreeable bread taste with improved nutritional properties.

Key words: Koda millet dehydrated powder, Beet root powder, Bread, Antioxidant, Sensory attributes

1. Introduction:

Millet grains are usually processed in various technologies that are used in manufacturing of food products. Several traditional household food processing and preparation methods can be used to enhance the bioavailability of micronutrients in plant-based diets (Akinola et al., (2017). These comprise thermal processing, mechanical processing, soaking, fermentation, and germination/malting. These methods help to enhance the physic-chemical accessibility of micronutrients, reduce the content of anti-nutrients, such as phytates and increase the content of compounds that improve bioavailability (Saleh et al., 2013).

Kodo millet is a rich source of protein and moreover it contains bioactive components enriched with the health-promoting activities. However, their presence in the Indian food basket has been declining over the years (Jukanti et al., 2016). The lack of technologies for their effective processing and utilization is an important reason for their refuse. Hence, we are in need to a technique which can aid the people to intake the bioactive compounds available in millets. Here novel techniques will be used for the dehydration to be given as food supplement.

Although wheat flour is usually used to make bread, other cereals such as rye barley, sorghum, maize, millet, and others have been used to make bread in various parts of the world, either alone or in combination with wheat flour. Several recent researches have suggested that barley, soybean, sorghum, and cowpea can be included into wheat flour at varying quantities, with rheological and baking qualities.

Protein/ immuno-modulatory substance from dehydrated millet powder will be optimized for the formulation and incorporated in bread to act as functional food and the formulation can impact high nutrition through improved immune status, cognitive and behavioral changes of peoples. The objectives of the work could be developing a high rich dietary fibre bread function diet/immunonutrition based development product from the indigenous foods available from the specific geographical trait.

2. Materials and methods

2.1.Raw Materials

Kodo millet grains (*Paspalum scrobiculatum*) for this study were procured at a local market in coimbatore, Tamilnadu, India. The grains were sorted, cleaned and screened to remove unwanted other irrelevant material. The kodo millet garins were well dried and cleaned manually from damaged grains and other foreign particles prior to their use. The grains were packed in screw-capped plastic containers and stored at 4° C for further analysis. Analytical grade reagents were purchased from Merck, Mumbai, India. Solvents and antioxidant assays reagents were purchased from Himedia, India.

2.2. Preparation of kodo millet powder (KMP) and kodo millet dehydrated powder (KMDH)

Stored grains divided into two parts for preparation of kodo millet powder (KMP) and kodo millet dehydrated powder (KMDH). Soaking, preparation of slurry and dehydration processed would carry out for the development of KMD and KMDH. Soaking was a simple prolongation of the obligatory washing of the seeds and also has other advantages, such as facilitating dehulling or swelling of seeds. After pre processing, the two parts of selected millets would be soaked in water for 8 in ambient temperature. After completed soaking process, the water would be drained from millets. Preparation of KMP, drained millets kept into tray drier at 60ºC 15-16 hours for drying, then it would be milled into fine powder by using a laboratory mill (A11B, IKA Inc, India) and preparation of KMDH, drained millets would ground to fine slurry by using wet grinding techniques. After grinding, the slurry would be filtered using muslin cloth and the filtrate would be dehydrated. The obtained millet slurry would be subjected to forced convection tray drying at 60ºC 15-16 hours. The KMP and KMDH would be packed in aluminium foil laminated LDPE pouches and stored at refrigerator temperature (4ºC) for further analysis and nutritive product development.

2.3. Preparation Beet root powder (BRP)

Beets were peeled and washed by manually. Grate the beetroot and bake for 3-4 hours at 50°C in a hot air oven. After that, the dried beetroot grating was ground into a fine powder and stored in an airtight container for further analysis.

2.4. Formulation of bread

The bread was prepared after the flour preparation, following a standard formulation, with the addition of three different composition of kodo millet powder (KMP) and kodo millet dehydrated powder with beet root powder (KMDHBRP) . Table 1 obtained the ingredients and its amount utilized in the bread preparation.

Table 1: Ingredients and its amount utilized in the bread preparation

Ingredients	Amount (g)
Wheat flour (g)	100
Sugar (g)	40
Milk powder (g)	10
Baking powder (g)	1
Butter (g)	15
Water (mL)	50

The formula for the preparation of bread is obtained in Tables 2 by using 0, 10, 20, and 30% of KMP and KMDHBRP with beet root powder (5 %, 10% and 15 %) composition. Dry materials (whole wheat flour, sugar, salt, millet and beetroot dehydrated powder, yeast) were blended and sieved to ensure that the leavening agents were evenly distributed throughout the flour. In a mixing bowl, a weighed amount of butter was swirled until it melted; water was added and the dough was continuously mixed to form dough. Knead the dough until it is smooth. The dough was let out for an hour to double in bulk. Shape the dough into a loaf pan and cover with a damp cloth to double in size. The dough was baked at 180°C for 15 minutes. The bread was allowed to cool for 30 minutes at room temperature before being stored in an LDPE cover for future testing.

Table 2: Composition of the flour to preparation of Biscuits

Treatment	Wheat flour (g)	Banana stem flour (g)	Beet root powder
Control (whole wheat flour)	100	0	0
MDP 1 (10% Millet dehydrated powder flour)	90	10	0
MDP 2 (20% Millet dehydrated powder flour)	80	20	0
MDP 3 (30% Millet dehydrated powder flour)	70	30	0
MDPBR 1 (10% Millet dehydrated powder plus 5 % beet root flour)	90	10	5
MDPBR 2 (20% Millet dehydrated powder plus 10 % beet root flour)	80	20	10
MDPBR 3 (30% Millet dehydrated powder plus 15 % beet root flour flour)	70	30	15

2.5. Quality Characteristics of developed bread

2.5.1. Proximate composition

The developed bread from KMP and KMDH with BRP were determined for their proximate composition (moisture, protein, ash, total fibre, energy and lipid) obtained standard AOAC (2005) methods. The value of carbohydrate was calculated by difference.

2.5.2. Water activity and Color analysis

Using a water activity meter (Aqualab Series 4TE, Decagon Devices, Inc., USA), the water activity of developed bread was determined at room temperature until the values were concurrent. Color of developed bread was analyzed from three dimensions: *L**, *a**, and *b** using a colorimeter (D-25, Hunter Associated Laboratory, USA), respectively.

2.5.2. Hardness

The texture was analyzed by dairy backward extrusion test using TA – HD Plus texture analyzer (Stable Micro Systems Ltd, Haslemere, UK) using Back Extrusion Cell (A/BE) with 35mm disc. The test speed was fixed at 1.5mm s-1 and distances of 15mm. Hardness of bread were determined through the braking strength and subsequent curve from peak force.

2.5.3.Sensory evaluation

Developed bread was evaluated for overall acceptability by using nine-point hedonic scale rating from dislike extremely to like extremely. A sensory panel of fifteen semi-trained members was involved from the public. Mean ± standard deviation is out of overall acceptability scores by fifteen-panel members

2.5.4. Statistical analysis

All observations were carried out in triplicates. Data collected were analyzed and computed by using SPSS 22 software (SPSS Institute Inc., Cary, USA). Values were manifested as mean ± standard deviation. Single factor ANOVA was employed to compute the significance of differences between mean values at $p<0.05$.

3. Results and Discussion

3.1. Optimized the kodo millet dehydrated beet root powder percentage

Sensory evaluation was conducted for the baked products that were developed by incorporating different proportions of the kodo millet dehydrated floue with beet root powder. The responses were recorded using a sensory score prepared using a nine point hedonic scale for various attributes (data was not shown). The mean scores for different attributes of chocolate was analysed using one-way ANOVA. A Significant difference among the variations for all the attributes observed. The mean score for all the attributes was found to be the highest for 20 % kodo millet flour with 5 % beet root powder. The panellists had the highest preference towards this percentage of kodo millet dehydrated flour due to the right balance of flavour, texture, and odour. Therefore further quality characteristics analysis of formulated bread to select this concentration kodo millet dehydrated flour with beet root powder.

3.2. Proximate composition of developed bread

The proximate composition (moisture, protein, fat, ash, carbohydrates and energy) values reflect the quality of the food and food product and they need to be accurate as well as appropriate for their intended consumption purpose. It prolongs its work to find out the qualitative and quantitative chemical changes taking place in product on storage and its effect on the overall quality and shelf life of the product. From the table 3 it reveals that protein, ash fiber, lipid and energy were low in control bread. The incorporation of KMP and KMDHBRP resulted in a considerable improvement in proximate composition of bread. The moisture content of KMP and KMDHBRP was found to be 19.2 ± 0.01 g/100 g and 21.5 ± 0.05 g/100 g respectively. The lower moisture content in KMP can render the bread to be more stable and is expected to enhance the shelf-life. The protein content of the KMP (9.26 ± 0.03 g/ 100g) was significantly higher than the KMDHBRP (7.62 ± 0.02 g/100g) and control 10.54 ± 0.05 g/100g). The ash content in bread of KMP

(2.42 ± 0.02g/100g) and KMDHBRP (2.05 ± 0.03 g/100g) has been reported to be higher control bread (2.32 ± 0.05 g/100g). An increase in the ash content of kodo millet dehydrated flour incorporation biscuit with increase in level of kodo millet dehydrated flour (Table 3) is obviously due to the high ash content of mustard flour as compared to wheat flour.

Table 3 Proximate composition of **KMP, KMDHBRPand control breads**

Parametes	Samples		
	Control	**MDPB**	**MDPBRB**
Moisture (g/100g)	24.2 ± 0.01 ^{a}	19.2 ± 0.01 ^{b}	21.5 ± 0.05 ^{b}
Carbohydrates (g/100g)	58.03 ± 0.05 ^{b}	62.08 ± 0.05 ^{b}	65.07 ± 0.03 ^{a}
Protein (g/100g)	10.54 ± 0.05 ^{a}	9.26 ± 0.03 ^{b}	7.62 ± 0.02 ^{c}
Ash (g/100g)	2.32 ± 0.05 ^{b}	2.42 ± 0.02 ^{a}	2.05 ± 0.03 ^{c}
Lipid (g/100g)	3.92 ± 0.03 ^{a}	3.85 ± 0.03 ^{b}	2.60 ± 0.01 ^{c}
Dietary fiber (g/100g)	3.58± 0.02 ^{c}	4.16± 0.02 ^{b}	6.25 ± 0.05 ^{a}
Calcium (mg/100g)	104.08 ± 0.05 ^{b}	94.03 ± 0.12 ^{b}	128.0 ± 0.18 ^{a}
Iron (mg//100g)	1.85 ± 0.02 ^{b}	1.69 ± 0.04 ^{c}	2.10 ± 0.02 ^{a}

Data expressed as Mean ± Standard deviation of Triplicates. Means within the same row have no common superscripts are significantly different (p<0.05).

The incorporation kodo millet dehydrated flour with beet root powder total crude fibre content could be increased significantly in bread. Results observed that fibre content could be higher in KMDHBRP (6.25 ± 0.05 g/100g) and KMP (4.16± 0.02 g/100g) were compared to Control bread (3.58± 0.02 g/100g) respectively. This is connected to the less fibre content of the wheat flour due to the outer deposit of the seed coat, which is more in fibre, being indifferent during the flour refinement. In addition, stem fibres naturally contain a significant percentage of fibres, such as hemi cellulose, cellulose, and lignified vascular tissues, compared with the cereal grains. During storage period the moisture content showed a variation in terms of increasing where as protein fat, fiber, ash, carbohydrate and energy remained the same with slight difference.

3.3. Physicochemical properties of developed bread

Water activity is a important parameter that manages the shelf life of the food products. Water activity of the KMP, KMDHBRP and control bread initial and during shelf life time was showed in table 4. From the results it was noted that the water activity of the KMP and KMDHBRP bread increased from 0.85 ± 0.02 and 0.82 ± 0.02 . Further, the water activity of the Control bread was also increased from (0.87 ±0.02). These findings are similar with the earlier studies including okra-based cookies (Park et al., 2015) and in amaretti cookies (Secchi et al., 2011). In the track of storage period increase in water activity of bread has been attributed to recrystallization of sugars (Shafi, Baba, Masoodi, & Bazaz, 2016). From the results it was observed that control bread had higher water activity compared to the kodo millet dehydrated flour bread.

Acceptability of bread is mainly related to the texture property. Hardness is considered the important characteristics of the baked product (Cheng & Bhat, 2016). Hardness of the KMP, KMDHBRP and control bread is presented in table 8. Significant change was observed in the textural characteristic of the kodo millet dehydrated flour bread and control bread. KMP and KMDHBRP bread showed lesser hardness (1.32 ± 0.01and 1.28 ± 0.01 N) compared to control bread (1.62 ± 0.06 N). These findings are comparable with the previous studies (S.K.Tyagi, et al, 2007) wherein incorporation of mustard flours caused in the increase in hardness of composite bread. The increase in fibre content could also be the shows potential reason of the harder texture detected due to its interaction during dough development. Further it was observed that hardness of the bread was found to be decreased as the time of storage increased.

Colour is a play a major role in baking product characteristic in addition to aroma, flavor and texture due to its contribution to consumer acceptance. Table 4 reported KMP, KMDHBRP and control bread of colour (L*, a*, and b*). The colour analysis results indicate that the kodo millet dehydrated flour-containing samples had statistically significant ($p < 0.05$) differences from control bread. This may be due to the process takes place during baking. The results were in accordance with the findings of (Chauhan et al., 2015; Cheng & Bhat, 2016). The kodo millet dehydrated flour containing bread (KMP and KMDHBRP) had a significantly higher L* (68.06 ± 0.12 to 36.08 ± 0.08) than the CB (74.08 ± 0.06). The L* of the kodo millet dehydrated flour containing bread may be attributed to the protein dilution, as the wheat flour was partially substituted with kodo millet dehydrated flour. During baking process starch caramelization and dextrinization which are hastened by heating changed the baked product colour (Cheng & Bhat, 2016).

Table 4 Physicochemical of KMP, KMDHBRPand control breads

Parametes	Samples		
	Control	**MDPB**	**MDPBRB**
Water activity(aW)	0.87 ±0.02 ^{a}	0.85 ± 0.02 ^{b}	0.82 ± 0.02 ^{c}
Hardness (N)	1.62 ± 0.06^{a}	1.32 ± 0.01^{b}	1.28 ± 0.01^{c}
L*	74.08 ± 0.06^{a}	68.06 ± 0.12 ^{b}	36.08 ± 0.08 ^{c}
a*	3.02 ± 0.03 ^{c}	4.08 ± 0.02 ^{b}	20.53 ± 0.04 ^{a}
b*	20.18 ± 0.08 ^{b}	25.10 ± 0.06 ^{a}	16.30 ± 0.07 ^{c}
Chroma (C*)	20.47± 0.05 ^{b}	25.76 ± 0.02 ^{a}	53.09 ± 0.04 ^{c}
Hue angle (H°)	81.48 ± 0.18 ^{a}	80.76 ± 0.15 ^{b}	38.30 ± 0.10 ^{c}

The a* values are pinpointing of the red and green colours, in which a positive a*value correlates to red, while a negative a* value pinpointing green colour. The a* value of KMP (4.08 ± 0.02) and KMDHBRP (20.53 ± 0.04) observed significantly lesser value were compare to control bread (3.02 ± 0.03). The results obtained from the present study are related to those from Hung et al. (2007), who suggested that the a* value of the baked product changed from –a* to a* values (green to red colour) as the wheat flour was partially substituted with whole waxy wheat flour. In contrast, the crust a* values were significantly higher for the control baked product than the samples substituted with kodo millet dehydrated flour. Similarly b* value found the significantly ($p < 0.05$) different of kodo millet dehydrated flour bread and control bread. The substitution of kodo millet dehydrated flour for wheat flour (KMP and KMDHBRP) (25.10 ± 0.06 and 16.30 ± 0.07) resulted in significantly greater b* values from the control bread (20.18 ± 0.08); this result indicates due to the original yellow pigment of the kodo millet dehydrated flour used. During storage time the L*of the bread slightly increase but the redness (a*) and yellowness (b*) decreased significantly.

3.4. Sensory characteristics

The bread prepared from kodo millet dehydrated flour, kodo millet dehrated flour with beet root powder and wheat flour (control) which was packed in LDPE cover and stored for time of four days and the scores are presented in table 5. The sensory factors namely appearance, flavor, texture, taste and overall acceptability are found to be acceptable up to 3rd day by panel members. The sensory scores were obtained to be decreased as the storage time increased in both the kodo millet dehydrated flour (KMP and KMDHBRP) and wheat flour made bread. The incorporation of YBF affects all the sensory parameters of bread as compared to the RBF and control bread. According to the statistical results, the KMP incorporation bread exhibited lower scores for color (7.53 ± 0.02) than the control bread (7.56± 0.01). Hathorn et al., (2008) suggested that in sensory properties colour is an important role in bakery products for consumers. Customers perceived bread as either colorless or dark and have preferences depending on which kind the bread appears to be. Presumptuous that is the case, consumers may prefer bread with the incorporation of kodo millet dehydrated flour, which would be light in colour. The sensory panelists rated the higher score both KMP and KMPDHBRP incorporation bread (8.2 ± 0.10 and 8.5 ± 0.30) for overall acceptability.

This outcome of sensory properties is similar to the bread with incorporated of soy flour and kinema flours (Shrestha, A. K., & Noomhorm, A. (2001). The preparation of bread substituted with kodo millet dehydrated at the 20% level (RBF) and 30 % (YBF) with remaining percentage of wheat flour added was comparable to the control bread in term of the overall acceptability. Therefore, it has potential use in bread applications.

Table 5 Sensory Evaluation of KMP, KMDHBRPand control breads

Sensory Attributes	Samples	Storage days				
		0^{th} day	1st day	2nd day	3rd day	4th day
Appearance	**Control**	7.5 ± 0.20 [a]	7.3± 0.10 [a]	7.2± 0.10 [a]	6.8± 0.10 [b]	6. 3± 0.10 [c]
	MDPB	8.0 ± 0.10 [a]	8.0 ± 0.10 [a]	7.9 ± 0.20 [a]	7.5± 0.10 [b]	7.2± 0.10[c]
	MDPBRB	8.3 ± 0.30 [a]	8.2 ± 0.20 [a]	7.9 ± 0.20 [b]	7.8± 0.10 [c]	7.5± 0.20[d]
Flavor	**Control**	6.6 ± 0.10 [a]	6.6 ± 0.10 [a]	6.3± 0.10 [b]	6. 2± 0.10 [b]	5. 9± 0.10 [c]
	MDPB	6.7 ± 0.20 [a]	6.6 ± 0.10 [b]	6.5± 0.10 [c]	6.5± 0.20 [d]	6.4± 0.20 [d]
	MDPBRB	7.5± 0.02 [a]	7.2 ± 0.10 [b]	7.2 ± 0.10 [c]	7.1± 0.10 [d]	7.0± 0.30 [d]
Texture	**Control**	7.6 ± 0.10 [a]	7.5± 0.10 [a]	7.2± 0.10 [a]	6.7± 0.10 [b]	6. 2± 0.10 [c]
	MDPB	8.2 ± 0.10 [a]	8.1 ± 0.10 [a]	8.0 ± 0.20 [a]	7.6± 0.10 [b]	7.2± 0.10[c]
	MDPBRB	8.4 ± 0.30 [a]	8.2 ± 0.20 [a]	8.1 ± 0.20 [b]	7.9± 0.10 [c]	7.6± 0.20[d]
Taste	**Control**	7.0 ± 0.10 [a]	6.9 ± 0.10 [b]	6.5± 0.20 [c]	6. 2± 0.10 [d]	6. 0± 0.10 [d]
	MDPB	7.5 ± 0.20 [a]	7.3 ± 0.15 [b]	7.0± 0.10 [c]	6.9± 0.20 [d]	6.5± 0.10 [d]
	MDPBRB	7.8± 0.20 [a]	7.6 ± 0.10 [b]	7.4 ± 0.10 [c]	7.2± 0.10 [d]	7.0± 0.10 [d]
Overall acceptability	**Control**	7.5 ± 0.20 [a]	7.0± 0.10 [a]	6.6± 0.10 [b]	6.3± 0.10 [c]	6. 0± 0.10 [c]
	MDPB	8.2 ± 0.10 [a]	8.0 ± 0.10 [a]	7.9 ± 0.10 [a]	7.2± 0.10 [b]	6.9± 0.10[c]
	MDPBRB	8.5 ± 0.30 [a]	8.4 ± 0.20 [a]	8.0 ± 0.20 [b]	7.8± 0.10 [c]	7.5± 0.20[d]

Data expressed as Mean ± Standard deviation of Triplicates. Means within the same row have no common superscripts are significantly different (p<0.05).

Conclusion

Incorporation of KMP and KMPDH of bread is more superior in nutritional characteristics. The formulated kodo millet dehydrated flour bread have higher fibre content when compared to the control bread which is made from refine wheat flour. However, the addition of the kodo millet dehydrated flour with beet root powder to the bread enhanced the fibre. These improvements were not observed in bread with the made of the wheat flour. In addition, bread containing kodo millet dehydrated flour resulted in a lighter appearance than the control bread. However, bread supplemented with kodo millet dehydrated flour with beet root powder had the greatest acceptability ratings by the panellists. There is no bread available in the market with this combination. This combination bread will pave way for reducing occurrence of life style diseases. This work established that the incorporation of kodo millet dehydrated flour with beet root powder results in a more nutritious and high fibre product with acceptable sensory and quality characteristics.

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Conflict of Interest

The authors declare no conflict of interest.

Reference

Akinola, S. et al. (2017). Effect of preprocessing techniques on pearl millet flour and changes in technological properties. International Journal of Food Science & Technology, 52(4), 992-999.

AOAC (2005). *Official methods of analysis* (16th ed.) Washington, DC: Association of Official Analytical Chemists.

Chauhan, A., Saxena, D., & Singh, S. (2015). Total dietary fibre and antioxidant activity of gluten free cookies made from raw and germinated amaranth (Amaranthus spp.) flour. LWT-Food science and Technology, 63(2), 939-945.

Cheng, Y. F., & Bhat, R. (2016). Functional, physicochemical and sensory properties of novel cookies produced by utilizing underutilized jering (Pithecellobium jiringa Jack.) legume flour. Food Bioscience, 14, 54-61.

Hathorn, C. S., Biswas, M. A., Gichuhi, P. N., & Bovell-Benjamin, A. C. (2008). Comparison of chemical, physical, micro-structural, and microbial properties of breads supplemented with sweetpotato flour and high-gluten dough enhancers. LWT-Food Science and Technology, 41(5), 803-815.

Jukanti, A. K., et al. (2016). Crops that feed the world 11. Pearl Millet (Pennisetum glaucum L.): an important source of food security, nutrition and health in the arid and semi-arid tropics. Food Security, 8(2), 307-329.

Park, J., Choi, I., & Kim, Y. (2015). Cookies formulated from fresh okara using starch, soy flour and hydroxypropyl methylcellulose have high quality and nutritional value. LWT-Food science and Technology, 63(1), 660-666.

Saleh, A. S., et al. (2013). Millet grains: nutritional quality, processing, and potential health benefits. Comprehensive reviews in food science and food safety, 12(3), 281-295.

Secchi, N., Stara, G., Anedda, R., Campus, M., Piga, A., Roggio, T., & Catzeddu, P. (2011). Effectiveness of sweet ovine whey powder in increasing the shelf life of Amaretti cookies. LWT-Food science and Technology, 44(4), 1073-1078.

Shafi, M., Baba, W. N., Masoodi, F. A., & Bazaz, R. (2016). Wheat-water chestnut flour blends: effect of baking on antioxidant properties of cookies. Journal of food science and technology, 53(12), 4278-4288.

Shrestha, A. K., & Noomhorm, A. (2001). Composition and functional properties of fermented soybean flour (kinema). Journal of food science and technology (Mysore), 38(5), 467-470.