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Development and standization of protein rich malt powder

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Abstract

Investigation on multigrain mixes were formulated using cereals, pulses, and oil seeds. The developed food mix was evaluated for sensory parameters, nutrient composition, and shelf life quality. The basic ingredients for the development protein rich malt powder were soya bean, cow pea, horse gram, samai, Italian millet, jowar, ragi, bajra, almonds, cashewnut, cardamom. The nutritive composition of developed protein rich malt powder contains as follows Protein-16.25(g), Fat-8.461(g), Fibre-4.605(g), CHO-50.83(g), Energy-346.27(k.cal), Calcium-102.02(mg), Iron-6.677(mg). Malt was germinated cereal and pulses grains that have been dried in a process known as "malting". the grains are made to germinate by soaking in water. Sprouting process the whole grams were soaked overnight. During sprouting dormant enzymes get activated and digestibility and availability of nutrients was improved. Vitamin C was synthesised during germination. On storage decrease in sensory acceptability decreased, due to development of rancidity was observed. The protein mix were acceptable even after 140 days of storage.

Keywords: Protein rich mix, sprouting, malting, nutrient composition, sensory evaluation, shelf life study

Introduction

Protein are the biochemical compounds consisting of one or more polypeptides typically folded into a globular or fibrous form in a biologically functional way.

Proteins are essential nutrients for the human body. They are one of the building blocks of body tissue, and can also serves a fuel source. As a fuel, proteins provide as much energy density as carbohydrates: 4 kcal (17 kJ) per gram; in contrast, lipids provide 9 kcal (37 kJ) per gram. The most important aspect and defining characteristic of protein from a nutritional standpoint is its amino acid composition.

Dietary sources of protein include both animals and plants: meats, dairy products, fish and eggs as well as grains, legumes and nuts.

Protein is a nutrient needed by the human body for growth and maintenance. Aside from water, proteins are the most abundant kind of molecules in the body. Protein can be found in all cells of the body and is the major structural component of all cells in the body, especially muscle. This also includes body organs, hair and skin. Proteins are also used in membranes, such as glycoproteins. When broken down into amino acids, they are used as precursors to nucleic acid, co-enzymes, hormones, immune response, cellular repair, and other molecules essential for life. Additionally, protein is needed to form blood cells.

The cereal and pulses include the soy beans, cow pea, horse gram, samai, Italian millet, jowar, ragi, bajra. Nuts and oils seeds include almond and cashewnut. Cardamom are used for development of protein rich malt powder.

The soya bean (*Glycine max*) is a species of legume native to East Asia, widely grown for its edible bean which has numerous use

Soya bean is one of the very few plants that endowed with high quality protein. Soya products contain essential nutrition, as well as vitamins, fibers, minerals. And is excellent resource for B complex vitamins and vitamins E. soya is a tremendous source of dietary fiber with soluble and insoluble fiber. Soluble fiber helps lesser serum cholesterol and control blood sugar. Insoluble fiber increases s David (2003) [1] reported that Soy foods are a traditional staple of Asian diets but because of their purported health benefits they have become popular in recent years among non-Asians, especially postmenopausal women.

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There are many bioactive soybean components that may contribute to the hypothesized health benefits of soy but most attention has focused on the isoflavones, which have both hormonal and non-hormonal properties.

Rajagopal (2017) [7] Studied that Horse gram (*Macrotyloma uniflorum*) - an underexploited poor man's pulse crop is a succulent, pubescent and drought resistant annual bushy herb which is an indigenous food crop of Indian peninsula gaining more importance for its high protein and fiber content. National Academy of Science recognized it as a potential food resource. This legume was commonly used by farmer community and low income group people due to its unacceptable taste and flavor in earlier days. But now, it can be consumed as whole, dehulled, splits, canned, boiled, roasted or ground into flour which occupied a very important place in human diet in many developing countries. Horse gram is not only having good nutritional profile but also occupies a prominent role both in traditional and modern medicine.

Mansikohli (2017) reported that bioactive substances such as phytic acid, phenolic acid, fiber, enzymatic/proteinase inhibitors have significant metabolic and/or physiological effects. The importance of horse gram was well recognized by the folk/alternative/traditional medicine as a potential therapeutic agent to treat kidney stones, urinary diseases, piles, common cold, throat infection, fever etc. The inception of nutraceutical concept and increasing health consciousness the demand of nutraceutical and functional food is increased.

Jayathilake *et al.*, (2018) reported that Cowpea (*Vigna unguiculata*) is a legume consumed as a high-quality plant protein source in many parts of the world. High protein and carbohydrate contents with relatively low fat content and complementary amino acid pattern to that of cereal grains make cowpea an important nutritional food in the human diet. Cowpea has gained more attention recently from consumers and researchers worldwide due to its exerted health beneficial properties including anti-diabetic, anti-cancer, anti-hyperlipidemic, anti-inflammatory and anti-hypertensive properties. Among the mechanisms that have been proposed in the prevention of chronic diseases

Dinesh Chandra *et al.*, (2016) [2] reported finger millet that It is rich in calcium (0.34%), dietary fiber (18%), phytates (0.48%), protein (6%–13%) minerals (2.5%–3.5%), and phenolics (0.3%–3%). Moreover, it is also a rich source of thiamine, riboflavin, iron, methionine, isoleucine, leucine, phenylalanine and other essential acids. The abundance of these phytochemicals enhances the nutraceutical potential of finger millet, making it a powerhouse of health benefiting nutrients. It has distinguished health beneficial properties, such as anti-diabetic (type 2 diabetes mellitus), anti-diarrheal, antiulcer, anti-inflammatory, antimicrobial properties

Moin Nex (2017) reported natural ingredient is packed with heart protective properties that help to prevent cardiovascular issues. Niacin residing in bajra plays a vital role in lowering cholesterol level in the blood. Magnesium and potassium in this grain help to regulate blood pressure. Other assorted phytonutrients in bajra lower the risk of heart attack. Allergy and Asthma in Children conclude that regular consumption of fish and grains (pear millet) can reduce asthma by percent. Researchers state that western diet lacks anti-inflammatory, omega-3 fats and vitamin E,

which is provided by fish and grains. However, people who're allergic to wheat must avoid ingesting them.

Methodology

The pulses and cereals include the soy beans, cow pea, horse gram, samai, Italian millet, jowar, ragi, bajra. Nuts and oils seeds include almond and cashewnut. Cardamom were selected for flavour and taste enhancement these are used development of protein rich malt powder.

Variations

Three variations were worked out to develop protein rich malt powder for 100gm.

Table 1: composition of different variations

S. No.	Ingredients	Variation-1	Variation-2	Variation-3
1.	Horse gram	13.5g	12.5g	10g
2.	Cow pea	13.5g	12.5g	10g
3.	Soy beans	7.5g	10g	15g
4.	Samai	10g	10g	10g
5.	Italian millet	10g	10g	10g
6.	Jowar	10g	10g	10g
7.	Ragi	10g	10g	10g
8.	Bajra	10g	10g	10g
9.	Almonds	5g	5g	5g
10.	Cashewnut	5g	5g	5g
11.	Cardamom	5g	5g	5g
	TOTAL	100g	100g	100g

Product development

At first ingredients such as soya beans, cowpea, horse gram, samai, Italian millet, jowar, ragi, bajra are soaked and sprouted. Then they are dried under sun drying for the removal of moisture. These are roasted and add almond and cashewnut. Grind in it and make into a fine powder.

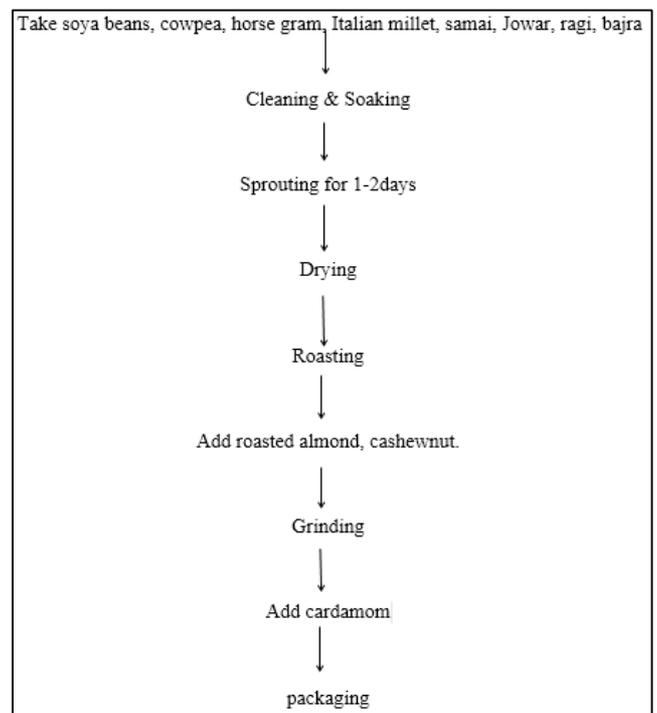


Fig 1: Flow chart for the preparation of protein powder

Sensory Evaluation

The sensory parameters such as were evaluated by panel of judges on a nine point hedonic scale. The sensory

parameters appearance, colour, taste, texture, flavour and over all acceptability of the protein rich malt powder were evaluated on a 9-point hedonic rating scale in which 1 for 'dislike extremely' and 9 for 'like extremely'. The average

and the mean values of the scores for each of the attributes were computed and analyzed statistically.

Results and discussion

Table 2: Organoleptic evaluation of prepared protein rich malt powder

S. No	attributes	Variation-i	Variation-ii	Variation-iii
1.	appearance	6.8	7.3	7.9
2.	colour	7.4	7.6	7.7
3.	texture	7.2	7.3	7.4
4.	flavour	7.2	7.2	7.6
5.	Overall acceptability	6.8	7.5	7.7

Sensory evaluation trails revealed that, among the experimental products the variation-3 protein rich malt powder is well accepted with regard to the attributes such as

appearance, texture, flavour and overall acceptability. However low scores were obtained for other two variations

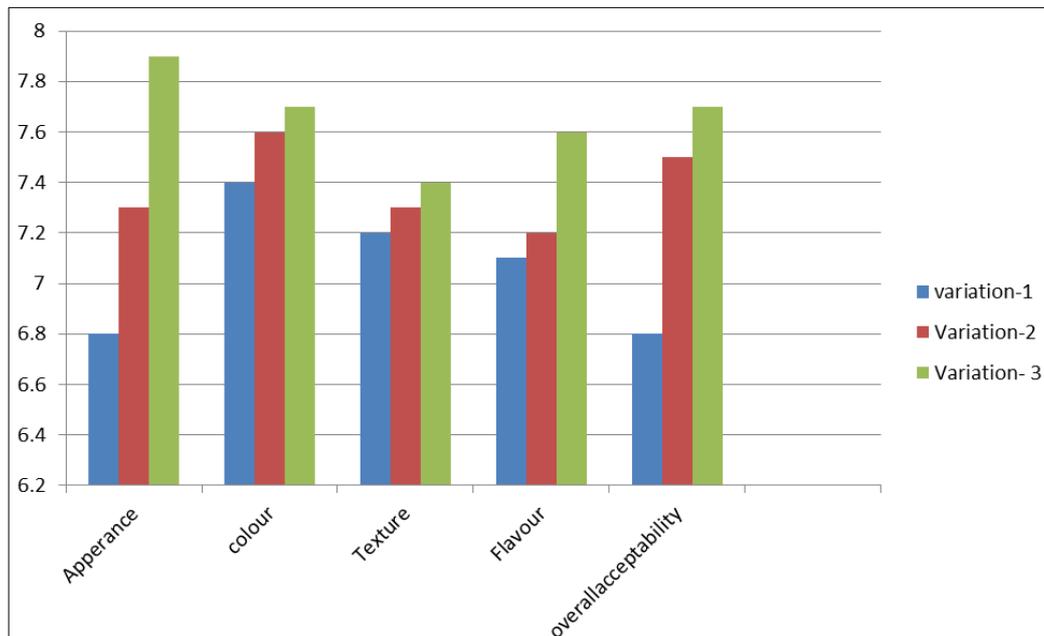


Fig 2: Bar diagram showing sensory evaluation comparison of three variations

Table 3: Nutrient Composition Of standardized Protein Rich Malt Powder

S.NO	Ingredients	Amount	Protein (g)	Fat (g)	Fibre (g)	CHO (g)	Energy (k.cal)	Calcium (mg)	Iron (mg)
1.	Soy beans	15g	4.32	1.95	0.37	2.09	43.2	36	1.56
2.	Horse gram	10g	2.2	0.05	0.53	5.72	32.1	28.7	0.677
3.	Cowpea	10g	2.41	0.1	0.38	5.45	32.3	7.7	0.86
4.	Ragi	10g	0.73	0.13	0.36	7.2	32.8	1.4	0.39
5.	Italian millet	10g	1.23	0.43	0.8	6.09	33.1	3.1	0.28
6.	Samai	10g	0.77	0.47	0.76	6.7	34.1	1.7	0.93
7.	Jower	10g	1.04	0.031	0.16	7.26	34.9	2.5	0.41
8.	Bajra	10g	1.16	0.5	0.12	6.75	36.1	0.42	0.8
9.	Almond	5g	0.93	2.6	0.07	0.47	29.4	11.5	0.25
10.	Cashewnut	5g	0.95	2.09	0.05	1.003	26.82	2.5	0.29
11.	Cardamom	5g	0.51	0.11	1.005	2.105	11.45	6.5	0.23
	Total	100g	16.25g	8.461g	4.605g	50.83g	346.27k.cal	102.02mg	6.677mg

It is evident from the above data that the nutritive composition of protein rich malt powder (Variation-3). The data from the above table shows that the, Protein-16.25(g), Fat-8.461(g), Fibre-4.605(g), CHO-50.83(g), Energy-346.27(k.cal), Calcium-102.02(mg), Iron-6.677(mg)

Protein

Protein are essential to all life in animals they help form supporting and protective structure such as cartilage, skin, nails, hair and muscles. Protein are vital to living organisms. Protein are the important consistent of tissue and cells of the body (Gopalan 1971) ^[3]

Table 4: One way ANOVA test for sensory attributes

Attributes	Source of variation	Sum of squares	Df	Mean of squares	F value	significant
appearance	Between group	5.51	2	2.75	7.48	0.002**
	Within treatments	9.95	27	0.36		
colour	Between group	0.47	2	0.23	0.65	0.52@
	Within treatments	9.38	26	0.36		
Flavour	Between group	1.06	2	0.53	1.05	0.36@
	Within treatments	13.6	27	0.50		
Texture	Between group	0.2	2	0.1	0.44	0.64@
	Within treatments	6.1	27	0.22		
Taste	Between group	4.46	2	2.23	4.24	0.02**
	Within treatments	14.2	27	0.52		
Over all acceptability	Between group	2.6	2	1.3	3.31	0.05@
	Within treatments	10.6	27	0.39		

Note:**-significant at 0.01% level

*-significant at 0.05% level

@Not significant

The results between samples and within samples were compared using one way ANOVA. That there is statistically significant difference at 0.05 percent respectively.

Overall acceptability indicates on the whole whether the product is fresh and acceptability for eating or not.

Conclusion

From The above study, it is evident that unconventional legumes like soy beans, horse gram and cow pea can be effectively used in the preparation of protein rich malt powder by properly processing legume and optimizing the levels of other ingredients in appropriate proportions. This is rich in protein and calorie and can act as a supplementary food for the malnourished people but this can also be used by normal people because it provides instant energy and other ingredients used in that preparation provides nutrients.

References

1. David Bell SH. Fernando ovalle Use of soy protein supplement and resultant need for increased dose of levothyroxine” Journal of nutrition, 2003.
2. Dinesh Chandra, satish Chandra, pallavi Sharma AK. Finger millet health benefits and nutrients” journal of food science and technology, 2016.
3. Gopalan C. Nutritive Value Of Indian Foods” national institute of nutrition, ICMR, Hyderabad, 1971.
4. ayathilakae. C, Visvanathan. R, Deen A, *et al.* An over view on Cowpea its nutritional facts and health benefits” Nutrition & Food science International journal, 2018.
5. Moynex. Nutrient composition of bajra”.functional food journal, 2017.
6. Mansikohli. Health benefits of horse gram” journal of cereal science, 2017.
7. Rajagopal V. Comparative effect of horse gram and black gram on inflammatory mediators and antioxidant status, 2017.