

Evaluation of Sensory And Nutritionally Evaluated Mix Grain Flour With Moringa And Beetroot Fortified Products

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ABSTRACT:

Background The moringa crop is a nutrition rich source which is used in multipurpose.

The study was carried out by recipe standardization and assessment of their physiochemical attributes i.e. moisture, ash, protein, iron and calcium. The products were prepared in food lab and analysis done in nutrition lab, dairy technology & plant pathology lab of university. There were seven product ratios of prepared biscuits.

Method: The sensory quality analysis of appearance of biscuit was maximum in two teaspoon moringa (7.1), taste in one teaspoon moringa (7.2), flavour in two teaspoon moringa (6.5), colour in three teaspoon moringa (7.0), texture in both one & three teaspoon moringa (7.3) were same and overall acceptability in one teaspoon moringa (7.0) than other developed products which were reported by panel members. It was found that percentage of moisture, ash, protein, iron & calcium were increased but the quantity of ash decrease (but increase as quality wise).

Results: This type research is remarkable step in the context of development of products for health benefits of people by supporting energy production, immune function and highly dense nutritional content its such a beautiful complement to vibrant health. From the evaluation founded that moisture, ash, protein, iron & calcium content in three teaspoon 30.02; 3.00; 17.46; 1.54; 473.50 respectively were maximum statistically significant the other ratio of products. The richest source of folate, manganese and betaines is beetroot. It act as reducing agent of homocysteine which is present in cysteine. The total utilization of food from origin is an integral aim of these resource. The leaves of this crop have disease preventive nutrients.



Conclusion: To produce the food which face the challenges of the world population which is nearly 9 billion by 2050. The different regional names as benzolive, drumstick, tree, kelor, marango, mulangay, nébéday, saijhan, mooringai and sajna. It has very high nutritional properties that would be useful as a food supplement especially in those relegated communities.

Key words: Morianga, Vitamin, Amino acid, protein, energy, Immunity etc.

Introduction

Morianga apply as a medicine due to the presence of acetone for the formation of herbal medicine. This herb is very effective in malaria. This is used to clean water impurities of drinking water. This is also rich in less than 1% alkaloids, tannin, flavonoids and phenol in the leaf which also rich in calcium, magnesium, iron and 45.4 % carbohydrate, 16.2 % protein and 9.68 % fibre. ⁽¹⁾

A 100g serving of raw beetroots provides:				
43 calories	2g protein	0g fat	10 carbohydrate	3g fibre

Beetroots, cooked
Nutritional value per 100 g (3.5 oz)

Energy	180 KJ (kcal)
Carbohydrates	9.96 g
Sugars	7.96g
Dietary fiber	2.0 g
Fat	0.18 g
Protein	1.68 g
Calcium	16 mg (2%)
Iron	0.79 mg (6%)

It is rich in antioxidants which helps in preventing damage DNA by inhibiting the destruction of free radicals within the body. Beets have mostly betalain which acts as an antioxidant within the body. This is used in treatment of illnesses relating to digestion and the blood⁽²⁾.

METHODOLOGY:

The present study was conducted in the department of Food Science and Nutrition, M.A.B College of Home Science, Chandra Shekhar Azad Agriculture University and Technology, Kanpur. The materials and methods adopted in the experiments conducted for attainment of various objectives of present investigation have been elaborated⁽³⁾.

Procurement of raw materials:

Selection of the moringa fresh leaves from C.S.A campus in Kanpur City.

Preparation of sample:**Selection of sample****Sorting****Washing****Boiling****Filtration****Collect the extract****Flow chart of the preparation of biscuit fortified with Moringa leaves:****Preheat the Oven (425⁰C)****Take bajra flour, wheat flour & baking powder****Beating the butter and sugar****Mix the flour, butter, sugar & drumstick liquid****Prepare the dough for biscuit****Then cut the biscuit into desirable shape****Bake for 12-15 min at 100⁰C****RESULTS AND DISCUSSION:**

The study deals with Chemical analysis, Correlation coefficient of prepared moringa leaves, Sensory evaluation of Recipes as biscuits fortified with moringa leaves and therapeutic effect of products through feedback (Joint pain).⁽⁴⁾

Table 1 and graph manifested that appearance was maximum found in beetroot fibre followed by M₃+B and M₁ flavour of the biscuit was maximum in beetroot fibre and texture of the biscuits was maximum found in M₃ & M₁ respectively. Colour of the biscuits was good in M₂+B and in beetroot fibre. Overall acceptability was maximum recorded in beetroot fibre followed by M₂+B and M₁ respectively. During the work it was found that moringa leaves and beetroot were helpful in increasing colour, appearance and nutritional value of the products⁽⁵⁾.

Table 2 and graph were shows that moisture content of flour is very important for its shelf life, lower the moisture content the better its storage stability. The mean score of control sample was 10 while the mean value of moisture in various samples (biscuit) was 3.1 in M₁, 3.5 in M₂, 3.5 in M₃, 3.7 in M₁+B, 3.6 in M₂+B, 3.7 in M₃+B & 3.7 in beetroot fibre⁽⁶⁾. From the table founded that moisture content in control was maximum statistically significant and minimum in M₁. Moringa leaves can easily lose moisture after harvesting, therefore harvest early in the morning and complete the initial phase of processing in the same day if possible. The value of Ash were found minimum in sample combination M₁+B (2.21%), M₁ (2.22%), M₂ (2.23%) & M₂+B (2.25%) statistically significant at par over control (4.67%). M₃ (3.00%) and M₃+B (3.01%) statistically significant under line by same bar over control (4.67%). The result from the table shows that control and fortified products were significant at 1% level of critical difference. The mean score of protein content in control sample of biscuit was 24.0 while the mean value of protein for M₁; M₂; M₃; M₁+B; M₂+B ; M₃+B & beetroot fibre fortified products were 17.38,17.41, 17.46, 17.56, 17.72, 18.21, 18.0 respectively. From the table founded that protein content of M₃+B were higher than beetroot fibre comparatively and lower of M₁ (17.38)⁽⁷⁾. The mean score of control was 2.50 & the mean value of iron in samples was maximum 2.71 in M₃+B & minimum 1.48 in M₁. The result from the table shows that control and fortified products were significant at 1% level of critical difference. The mean score of calcium content in control sample of biscuit was 483 while the mean value of calcium for M₁ (470.83); M₂ (472.50); M₃ (473.50); M₁+B (474.27); M₂+B (475.33); M₃+B (481.13) & beetroot fibre (480.10). From the table founded that calcium content in M₃+B was maximum & minimum in M₁ statistically significant. Calcium which builds strong bones and teeth and helps⁽⁸⁾.

Treatment	Appearance	Taste	Flavour	Texture	Colour	Overall acceptability
Control	9.0	8.0	8.0	8.7	8.0	8.5
M ₁	7.0	7.2	6.3	7.3	6.5	7.0
M ₂	7.1	6.6	6.5	6.8	6.8	6.8
M ₃	6.6	6.6	6.1	7.3	7.0	6.7
M ₁ +B	7.0	7.4	6.3	7.0	6.3	6.6
M ₂ +B	6.8	6.8	6.3	7.0	7.2	7.0
M ₃ +B	7.2	6.7	6.3	6.5	6.7	6.3
Beetroot fibre	8.1	7.0	6.7	7.2	7.7	7.2
SE (diff.) ±	0.352	0.320	0.259	0.399	0.294	0.143
CD at 0.05	0.708	0.644	0.522	0.802	0.590	0.287

prevent osteoporosis. 40% of the calcium needs for a child aged 1-3.

It can be observed from Table 3 Correlation coefficient between nutrients, ash percent of moringa fortified biscuits significantly correlated with Calcium at 5% level of significant and ash percent was positively correlated with protein and iron both. Moisture percent positively correlated with ash percent and protein of moringa fortified biscuits. Protein of the moringa fortified biscuits non significant with Iron and significant with Calcium at 5% level of significant. Iron of the moringa fortified biscuits positively significantly correlated with Calcium⁽⁹⁾.

Table No 1- Mean Score of organoleptic acceptability of moringa fortified biscuit:-

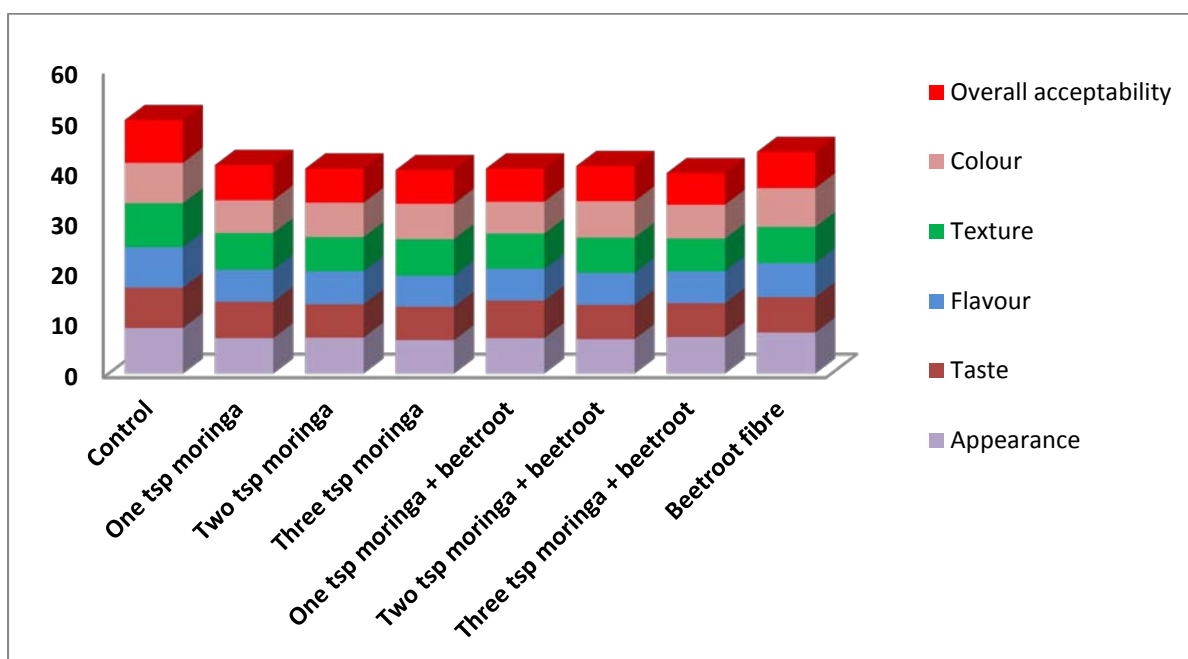


Table 2 -Mean score of analysed nutritional content of developed products of moringa fortified biscuit:

S.No.	Treatment	Moisture (%)	Ash (%)	Protein (g)	Iron (mg)	Calcium (mg)
1.	Control	10	4.67	24.00	2.50	483.00
2.	M ₁	3.1	2.22	17.38	1.48	470.83
3.	M ₂	3.5	2.23	17.41	1.52	472.50
4.	M ₃	3.5	3.00	17.46	1.54	473.50
5.	M ₁ + B	3.7	2.21	17.56	1.65	474.27
6.	M ₂ + B	3.6	2.25	17.72	1.61	475.33
7.	M ₃ + B	3.7	3.01	18.21	2.71	481.13
8.	Beetroot fibre	3.7	4.12	18.00	2.63	480.10
SE (diff) _±		0.29	0.464	1.043	0.145	1.327
CD (0.01)		0.62**	0.984**	2.212**	0.307**	2.813**

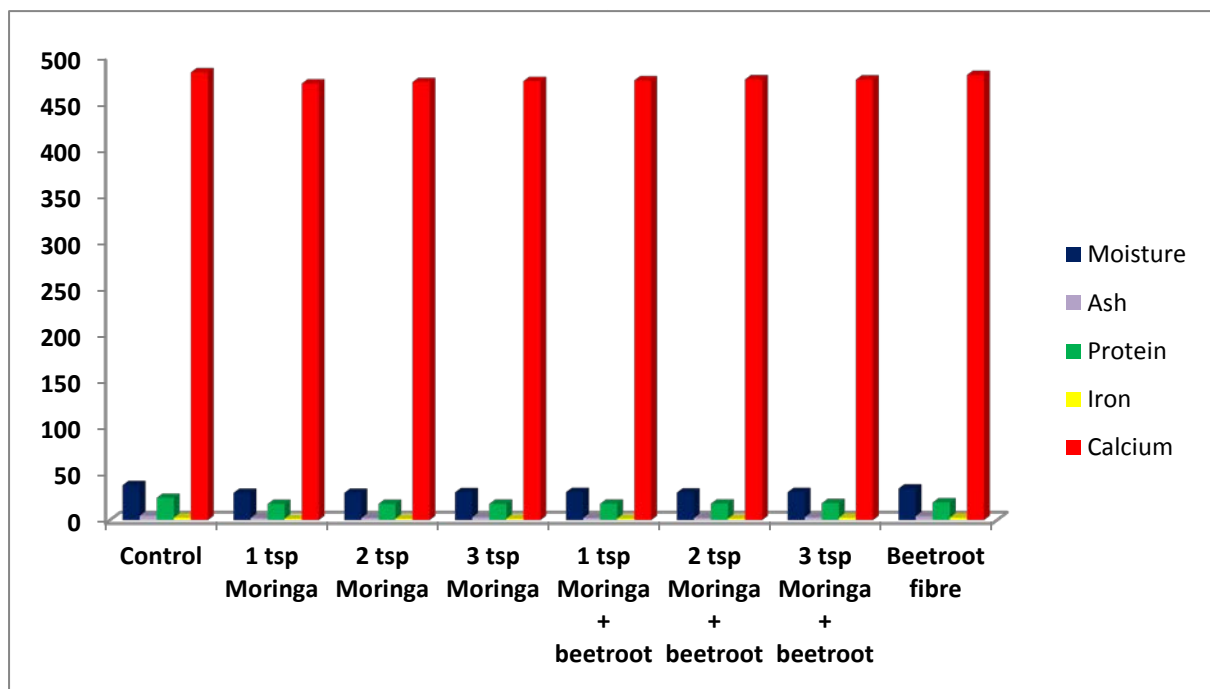
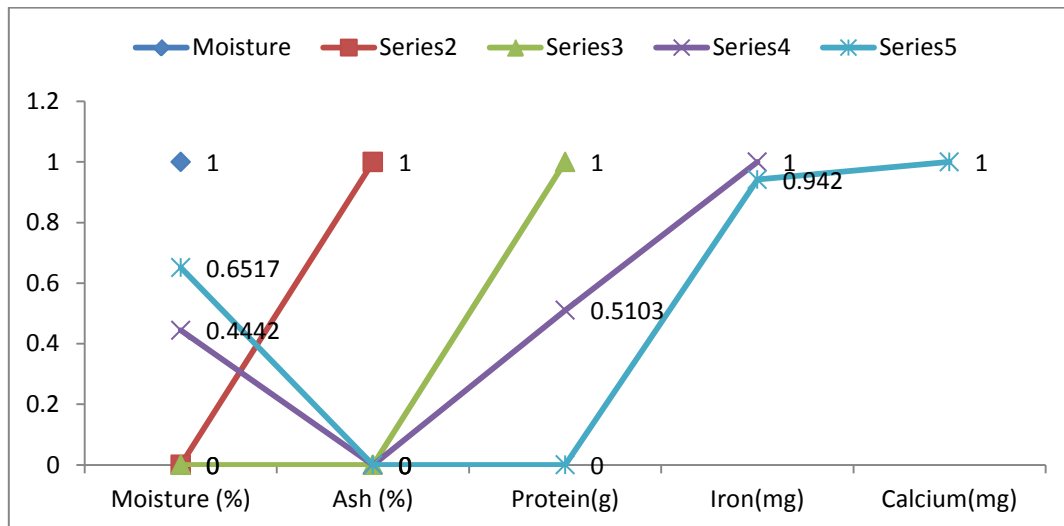


Table 3- Correlation coefficient between analysed nutritional content:-

Nutrients	Moisture (%)	Ash (%)	Protein(g)	Iron(mg)	Calcium(mg)
Moisture	1	-	-	-	-
Ash	0.7425*	1	-	-	-
Protein	0.9951*	0.7709*	1	-	-
Iron	0.4442	0.7800*	0.5103	1	-
Calcium	0.6517	0.8350*	0.7061*	0.9420	1



CONCLUSION:

This study indicates that the developed products of biscuit with moringa and beetroot can be easily prepared under optimized condition. The various parameters such as moisture, crude protein, iron, total ash and calcium were analyzed. The sensory evaluation of products on all attributes (appearance, taste, flavour, texture, colour & overall acceptability) was found in biscuit which was highly acceptable, due to bajra flour, wheat flour, moringa oleifera leaves, beetroot, milk cream and butter. It has very high nutritional properties that would be useful as a food supplement especially in those relegated communities and helps in reducing joint pain. The analysed nutritional content (protein, iron calcium) of developed products concluded that nutritive value of beetroot fibre was highest then other developed products. Beets are especially rich in betalain the antioxidant that is responsible for their red color. Beetroot fibre has been increase the level of **antioxidant enzymes** in the body (specifically one called glutathione peroxidase) as well as increase the number of white blood cells which are responsible for detecting and eliminating abnormal cells. Beets are also one of the richest sources of glutamine an amino acid essential to the health and maintenance of the intestinal tract^(11,12).

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