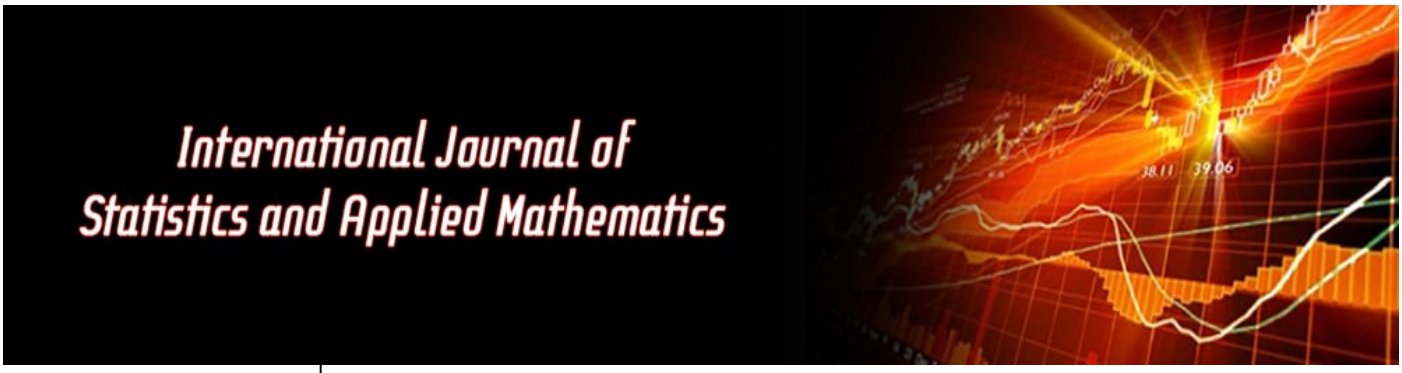

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Nutritive value and organoleptic evaluation of NutriBar prepared from Ragi flour, Dates and Amla powder to promote Superfoods

Shreya and Dr. Vinita Singh

Abstract
The present study was carried out in the department of food Science and Nutrition, Chandra Shekhar Azad University of agriculture and technology, Kanpur, Uttar Pradesh with the objective of "Nutritive value and organoleptic evaluation of NutriBar prepared from Ragi flour, Dates and Amla powder to promote Superfoods" Superfood is a relativity recent way of referring to foods that provide the most nutritious value for the fewest calories. They include a wealth of antioxidants, vitamins and minerals. Three superfoods *viz*. Ragi flour, Dates and Amla powder were used for making incorporated product i.e., NutriBar in three treatments i.e. (T_1, T_2, T_3) and same control product T_0(non- incorporated) are made in control products, Incorporated NutriBar and Control NutriBar were analysed for its sensory characteristics. This revealed that all incorporated products had better quality in terms of colours, taste, texture, flavour, and overall acceptability than Control products (non-incorporated). It can be Interpreted from the current study that incorporation of the Ragi flour, Dates and Amla powder in food product (NutriBar) increased their nutritional value. Ragi flour, Dates and Amla powder enhance the protein, calcium, vitamin C, Iron content in the incorporated food product (NutriBar). Food products (NutriBar) incorporated with Ragi flour, Dates and Amla powder more nutritious than control (non-incorporated) food samples prepared from 100 percent peanuts, almond and jaggery.

Keywords: NutriBar, superfoods, dates, ragi flour, amla powder, nutritive-organoleptic

Introduction
Super foods are incredibly rich in micronutrients, including antioxidants, enzymes, health fats, vitamins, and minerals. Your body needs each of these nutrients to function properly. There are 3 superfoods which I have taken for making value added products which are Ragi, Dates, Amla powder. Ragi is the most significant millet that we may use on a regular basis. It is more advantageous and less expensive than all other millets. The cheapest and simplest superfood on the market is ragi. Calcium (ca) and phosphorous (p), two significant minerals, are present in ragi grains. Compared to other millet species, the grains have the highest concentration of calcium Nutritional value of ragi: -Protein(g)-7.7, Carbohydrate (g)-72.6, Fat (g)-1.5, Calcium (mg)-344, Phosphorous (mg)-250, Manganese (mg)-3.5, Iron (mg)-6.3, Magnesium (mg)-130, Crude fat (g) -3.6, Ash (g) -2.7. Dates are rich in antioxidants and fibre. Their nutritional advantages might promote brain function and shield against illness. Dates' fibre content may also help with blood sugar regulation. Dates provide the following nutrients: Calories-277 kcal, Carbs-75 gm, Fibber-7 gm, Protein-2 gm, Potassium-15% DV, Magnesium -13% DV, Copper -40% DV, Manganese - 13% DV, Iron - 5% DV, Vitamin B6-15% DV. Amla, commonly referred to as Indian gooseberries Amla berries contain soluble fibre that dissolves quickly in the body, which helps to slow down how quickly sugar is absorbed by the body. Blood sugar surges may be lessened as a result. Considering the fact that developing the value-added products can make best use of Ragi flour, Dates and Amla powder for introducing these medicinal properties Nutritive value of Amla: -Calories-66, Protein-1 gram, Fat - <1 gram, Carbs - 15 grams, Fibber -7 grams, Vitamin C - 46%, Vitamin B5-9%, Vitamin B6 -7%, Copper - 12%, Manganese- 9%, Potassium-6%.

Benefits of value-added products: -People these days give serious thought to how their diet can affect their health and want to eat foods that can help them live healthier lives. This circumstance has aided in the growth of significant food consumption trends, including a rise in consumer interest in foods with natural and healthful features. Foods that have been enhanced with bioactive substances like phenolic, mineral compounds, vitamins, and natural colorants fall under the category of foods with health benefits, whereas foods without artificial additions and human interventions are deemed to be healthier for the body by consumers.

Methodology

Period of the study

June 2022 to June 2023

Procurement of raw material

All the raw materials were purchased from the local market of Kanpur city.

Nutritional analysis of prepared sample through AOAC

Proximate constituent's *viz*., crude fiber, ash contents in the sample were determined by standard method of AOAC (2010) [10] Protein by kjeldahl method.

Determination of Carbohydrate

The total CHO content in value added products were calculated by difference method.

Total CHO (%) = 100- (Moisture+ Crude protein +Total ash +Fat +Crude fiber)

Estimation of minerals

Minerals *viz* calcium and iron in the value-added products sample were estimated in the triplicate Calcium content of value-added products sample was estimated by titrimetric method of AOAC (1995) [11]. Iron was estimated calorimetrically by Wong's method as given by Ranganna (1986) [12] using the principle that ferric ion gives blood red colour with potassium thiocyanate. Determination of vitamin C (ascorbic acid) by titration, in the absence of interfering substance that may reduce the dye of oxidize ascorbic acid during sample preparation. The capacity of a sample is to reduce a standard dye solution. As determined by redox titration, is directly proportional to the ascorbic acid content.

Nutribar prepared from ragi flour, dates and amla powder

Incorporated Nutribar in which ragi flour, dates and amla powder was used in the ratio of 10:12:10, 12:8:12 and 14:4:14.

Table 1: Recipe for Nutribar prepared from ragi flour, dates, amla powder

Ingredient (in g.)	T_0	T_1	T_2	T_3
Ragi flour	-	10	12	14
Dates	-	12	08	04
Amla powder	-	10	12	14
Peanuts	10	16	16	16
Almond	20	02	02	02
Jaggery	70	50	50	50
Ghee	10	10	10	10

Method

1. First dry roast ragi flour in a pan on a lowered flame.
2. Then roast other ingredient i.e peanuts and dry fruits and then in a mixer, add all dry fruits and peanuts and dates blend and mix them well.
3. Now add ghee to a hot pan and add jaggery in that then add roast ragi flour and stir nicely with the help of a spatula
4. Now deliver the mixture to a pan and stir nicely with the help of a spatula
5. Now transfer the mixture to a tray and add amla powder it that and mix it well.
6. Press the mixture with the back steel katori to plane and even out the surface.
7. Let the mixture cool in the refrigerator for a minimum of 45 min or m
8. Now, when the mixture is all set, cut it into pieces/ small bar.

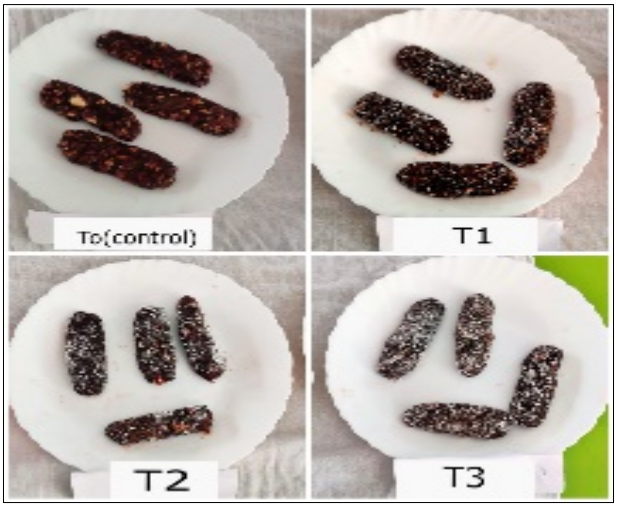

Fig 1: Control and value added Nutribar

Sensory evaluation of developed products

The acceptability of Incorporated Nutribar was evaluated by panel of 10 judges using 9- point hedonic scale (Ranganna, 1986) [12] to test the liking or disliking of products.

Statistical analysis

The experiments were carried out in triplicate and data so obtained were subjected to analysis of Mean ± SD. The obtained data were interpreted at 5% level of significance (p<0.05).

Results and Discussion

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads. The data of mean score were tabulated and analyzed statistically; results has been presented in table.

Table 2: Organoleptic evaluation of control and Incorporated Nutribar

Level of incorporation						
Parameter	**T_0control**	**T_1(10:12:10)**	**T_2(12:8:12)**	**T_3(14:4:14)**	**CD (5%)**	**S. E**
Colour	7.6	7.8	8.4	8.43	0.97	0.32
Taste	7.8	8	8.2	8.4	0.99	0.33
Texture	7.6	7.8	7.8	8	1.29	0.43
Flavour	6.96	7.05	7.13	8.87	0.12	0.04
Appearance	7.4	7.8	7.8	8.2	0.79	0.26
Overall acceptability	6.6	7.4	8	8.6	0.92	0.31

Organoleptic acceptability of incorporated NutriBar revealed that 14:4:14(T_3) Ragi flour: Dates: Amla powder incorporated NutriBar was liked extremely while 10:12:10(T_1) and 12:8:12(T_2) incorporated NutriBar was liked Very much while Control product (T_0) was liked moderately.

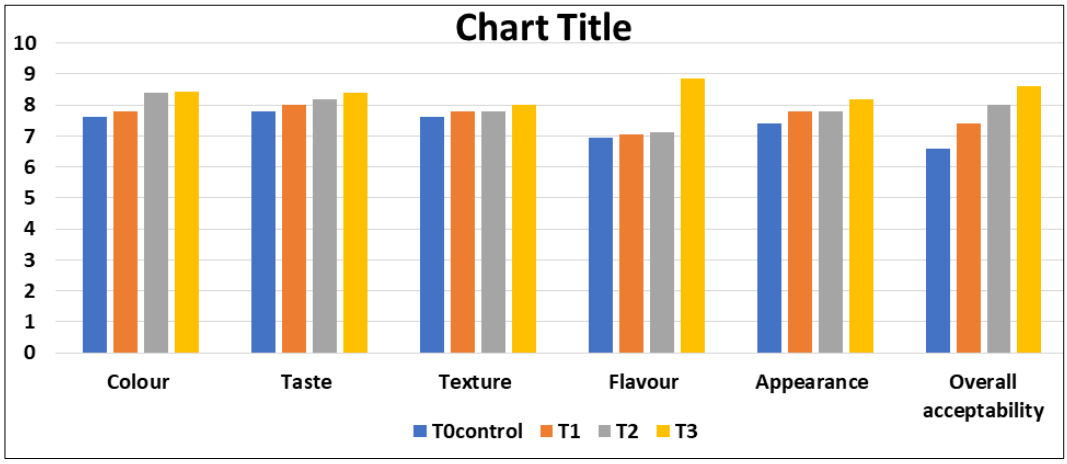

Fig 2: Mean score of Organoleptic evaluation of control and Incorporated Nutribar

Table 3: Nutritional composition of control and Incorporated Nutribar's

Nutrients	**Control (T_0)**	**T_1(10:12:10)**	**T_2(12:8:12)**	**T_3(14:4:14)**	**CD (5%)**	**S. Em**
ASH	1.50	2.87	3.30	3.35	0.79	0.20
FIBER	2.15	4.14	4.6	5.41	0.47	0.12
Protein	5.53	5.31	6.52	7.26	0.12	0.03
Carbohydrate	62.14	56.53	57.3	58.67	1.15	0.29
Calcium	90.32	134.31	140.26	147.25	0.60	0.15
Iron	2.41	5.00	4.43	4.06	0.72	0.18
Vitamin c	0	58.69	60.21	62.18	0.32	0.08

Nutritional Analytical procedure for NutriBar

- Ash content of (T_1) 10:12:10 ragi, dates and amla powder incorporated Products were 2.87% percent, (T_2) 12:8:12 were 3.30%, (T_3) 14:4:14 were 3.35% respectively. The ash content of Control product (T_0) was 1.50%. The ash contents of incorporated product (T_1) were higher than Control product (T_0) and other incorporated products (T_2, T_3). Its indicates that T_3 Incorporated Nutribar were found highly significant at the level of 5% in critical difference respect to ash content than control and other incorporated Nutribar's.
- Fiber content of (T_1) 10:12:10 ragi, dates and amla powder incorporated Products were 4.14% percent, (T_2) 12:8:12were 4.6%, (T_3) 14:4:14 were 5.41% respectively. The fiber content of Control product (T_0) was 2.15%. The fiber Content of incorporated product (T_3) was higher than Control product (T_0) and other incorporated products (T_1, T_2). Its indicates that T_3 Incorporated Nutribar were found highly significant at the level of 5% in critical difference in respect to fiber content than control and other incorporated Nutribar's.
- Protein content of (T_1) 10:12:10ragi, dates and amla powder incorporated Products were 5.53% percent, (T_2) 12:8:12 were 6.52%, (T_3) 14:4:14 were 7.26% respectively. The protein content of Control product (T_0) was 5.31%. The protein Content of incorporated product (T_3) was higher than Control product (T_0) and other incorporated products (T_1, T_2). Its indicates that T_3 Incorporated Nutribar were found highly significant at the level of 5% in critical difference in respect to protein content than control and other incorporated Nutribar's.
- Carbohydrates content of (T_1) 10:12:10ragi, dates and amla powder Incorporated products were 56.53% percent, (T_2) 12:8:12 were 57.3%, (T_3) 14:4:14 were 58.67% respectively. The carbohydrates content of Control product (T_0) was 62.14%. The carbohydrates content of incorporated product (T_3) was higher than other incorporated products (T_1, T_2). Its indicates that T_3 Incorporated Nutribar were found highly significant at the level of 5% in critical difference in respect to carbohydrates content than control and other incorporated Nutribar's.

- Calcium content of (T_1) 10:12:10 ragi, dates and amla powder incorporated Products were 134.31mg, (T_2) 12:8:12 were 140.26 mg, (T_3) 14:4:14 were 147.25 mg respectively. The calcium content of Control product (T_0) was 90.32 mg. The calcium content of incorporated product (T_3) was higher than Control product (T_0) and other incorporated products (T_1, T_2). Its indicates that T_3 Incorporated Nutribar were found highly significant at the level of 5% in critical difference in respect to calcium content than control and other incorporated Nutribar's.
- Iron content of (T_1) 10:12:10 ragi, dates and amla powder incorporated Products were 5.00 mg, (T_2)12:8:12 were 4.43 mg, (T_3) 14:4:14 were 4.06mg Respectively. The iron content of Control product (T_0) were 2.41mg. The iron Content of incorporated product (T_1) was higher than Control product (T_0) and other incorporated products (T_2, T_3). Its indicates that T_3 Incorporated Nutribar were found highly significant at the level of 5% in critical difference in respect to iron content than control and other incorporated Nutribar's.
- Vitamin C content of (T_1) 10:12:10 ragi, dates and amla powder Incorporated products were 58.69 mg, (T_2) 12:8:12 were 4.43 mg, (T_3) 14:4:14 were 4.06mg respectively. The vitamin c content of Control product (T_0) were 0.0mg. The vitamin C content of incorporated product (T_3) was higher than Control Product (T_0) and other incorporated products (T_1, T_2). Its indicates that T_3 Incorporated Nutribar were found highly significant at the level of 5% in critical difference in respect to vitamin C content than control and other incorporated Nutribar's.

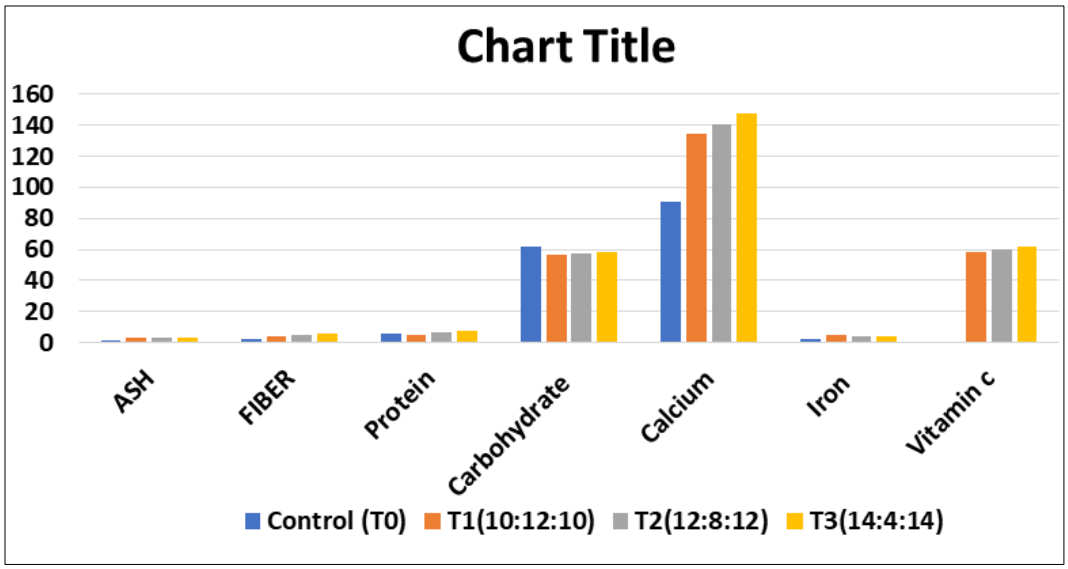

Fig 3: Nutritional composition of control and Incorporated NutriBar's

Conclusion

The various parameters such as ash, crude protein, carbohydrate crude Fiber Calcium Iron and Vitamin C were analyzed. Organoleptic acceptability of Incorporated Nutribar's prepared from Ragi flour, Dates and Amla powder (Super foods) were analyzed by panel members. T_3 (14:4:14) incorporated Nutribar's had better sensory characteristics than control (T_0) and other incorporated Nutribar(T_1 and T_2). All incorporated products (Nutribar's) had better quality than control Nutribar in respect to nutrition. The ash and fiber content in incorporated Nutribar's was increased as increased of ragi flour and dates content in the product. Protein content was increased with increased in ragi flour and dates in Incorporated Nutribar's. Calcium and iron content in Incorporated Nutribar was much higher than control.

The new nutritious natural and healthy processed foods are in great demand. There is immense potential to develop varied value-added product of Ragi flour, Dates, and Amla powder (Super foods) without much losing its medicinal properties.

It can be predicted that the value-added products prepared from Ragi flour, Dates and Amla powder (Super foods) will be accepted by the people for taking advantage of their medicinal properties for good health.

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