

Research Note :

DEVELOPMENT AND NUTRITIONAL ANALYSIS OF PRODUCTS FORTIFIED WITH MORINGA (*Moringa oleifera*)

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ABSTRACT : The study was carried out by recipe standardization and assessment of their physico-chemical properties. The sensory quality analysis of Biscuit was 7.28 than other developed products which were reported by panel members. It was found that percentage of moisture, fat, protein, carbohydrate and fibre were increased but the quantity of ash decreased (but increase as quality wise). The other developed products acceptability on basis of organoleptically and nutritional were decreased as well as in quantity and quality wise. This type research is remarkable step in the context of development of products for health benefits of people in one and other hand.

Keywords : *Moringa leaves, products, chemical composition.*

Moringa oleifera Lam or Drumstick leaves, belongs to a monogenetic family Moringaceae, is considered to have its origin in Agra and Ouch, in the northwest region of India, south of the Himalayan Mountains. Although the name "Shigon" for *M. oleifera* is mentioned in the "Shushruta Sanhita" which was written in the beginning of the first century A.D. There is evidence that the cultivation of this tree in India dates back many thousands of years. The Indians knew that the seeds contain edible oil and they used them for medicinal purposes (Fahey, 3; Rao, 5). The common people also knew of its value as a fodder or vegetable. This tree can be found growing naturally at elevations of up to 1,000 m above sea level. It can grow well on hillsides but is more frequently found growing on pasture land or in river basins. It is a fast growing tree and has been found to grow to 6 – 7 m in one year in areas receiving less than 400 mm mean annual rainfall. As a non-cultivated plant it is known for its resistance to drought and diseases. Because this tree has so many potential uses. We have been conducting an extensive research program on it over the last 10 years with the financial assistance of the Austrian Government and University of Hohenheim, Stuttgart.

The plant possesses many valuable properties (Table 1) which make it of great scientific interest. These include the high protein content of the leaves, twigs and stem, the high protein and oil contents of the seeds, the large number of unique polypeptides in seeds that can bind to many moieties, the presence of growth factors in the leaves, and the high sugar and starch content of the entire plant (Anwar *et al.*, 1;

Bamishaiye *et al.*, 2; Ramchandran, 4). Moringa leaves enormously contain seven times vitamin-C over oranges, four times vitamin- A and calcium over carrots and milk, respectively, three times potassium of bananas and two times protein of yoghurt. Equally important is the fact that few parts of the tree contain some toxins that might decrease its potential as a source of food for animals or humans. All parts of the Moringa tree are edible and have long been consumed by humans.

Table 1: Nutritional value of fresh *Moringa oleifera* (Drumstick leaves).

Nutrients	Content (g/100g)
Moisture	75.0 g
Ash	7.6 g
Protein	6.7 g
Fat	0.9 g
Fibre	1.0 g
Carbohydrate	9.8 g
Vitamin A	6.78 mg
Vitamin B1	0.06 mg
Calcium	440 mg
Iron	0.85 mg
Zinc	0.16 mg

1. **Procurement of raw material** - Selection of the drumstick fresh leaves from Moring plants grown in C.S.A.U.A. &T., campus in Kanpur.
2. **Preparation of sample** - 1-Selection of sample/fresh leaves, 2-Sorting, 3-Washing,

4-Sundrying or Oven drying (65o C for 1 hour),
5-Grinding (2 times), 6-Sieving (2 times),
7-Storage.

3. **Development of products** - Soup, Biscuit, Corn cutlet, Ricemurku.

4. **Nutritional analysis of sample –**

✓ **Moisture** : The moisture content in the sample was determined by Oven drying method.

✓ **Ash** : Ash content represent the total mineral present in a biological material.Total ash content was determined by incineration of sample in a muffle furnace, at 550°C.

✓ **Protein** : Crude protein was determined by multiplying total N content in sample by the factor 6.25. Total N content in sample was determined by micro - Kjeldahl method as described by Sadasivam and Manickam (6).

✓ **Fat** : The sample of dried feed stuff was placed in a continuous extractor (Soxhlet) and subjected to extraction with ether.

✓ **Carbohydrate** : The total CHO content was calculated by difference method.

✓ **Total CHO (%)** = 100 - (Moisture + Crude Protein + Total Ash + Fat + Crude Fibre).

✓ **Fibre** : The dry fat free material was boiled successively with dilute acid and dilutes alkali for a specified time period and filtered.

5. Statistical analysis : Mean score of organoleptic sensory evaluation and chemical composition of developed products were analyzed statistically (Table 2). The mean score of chemical analysis of (moisture, protein, fat, carbohydrate, fibre and ash) of developed products are depicted in Figure1.

The results depicted in Table 2 revealed that mean score of moisture was maximum in corn cutlet (47.46g) and minimum score was found in rice muruku (15.77g). The corn cutlet was developed by corn flour; moringa

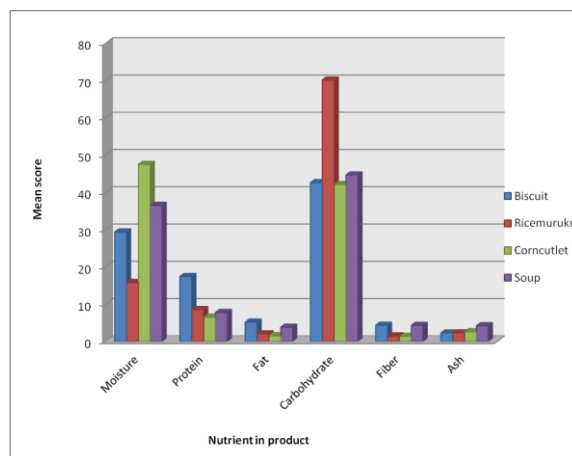


Figure 1: Mean score of chemical composition in developed products.

leaves powder, coriander leaves and ginger. The highest mean score of protein was found in biscuit (17.38g) and minimum was in corn cutlet (6.49g). In analysis of fat in biscuit was maximum (5.16g), whereas the minimum score was in corn cutlet (1.48g). The mean score of the carbohydrate in biscuit was maximum (70.09g). This was due to presence of milk cream and butter. The minimum mean score of fibre was found in corn cutlet (1.37g) and maximum in biscuit (4.29g). Ash content was highest in soup (4.18g) and lowest in biscuit (2.22g).

The nutritive value of developed product was highest in biscuit due to the presence of barley flour, fresh milk cream, baking powder, stevia leaves powder, moringa leaves powder and butter which might had increased nutritive value of biscuit.

During the previous work it was found that moringa leaves were helpful in reducing joint pain. The highest nutritive value product (biscuit and soup) were introduced to the respondents, due to the product with good nutritional and medicinal value. The respondents were consuming this product regularly (till 1 month) then, they reported about relief at their joint pain after consuming the product

Conclusion

This study indicates that the developed products (biscuit, corn cutlet, soup and rice muruku) with

Table 2 : Nutritive value of developed products (per 100g basis).

Product	Moisture (g)	Protein (g)	Fat (g)	Carbohydrate (g)	Fibre (g)	Ash (g)
Biscuit	29.32	17.38	5.16	42.55	4.29	2.22
Rice Muruku	15.77	8.49	1.96	70.09	1.44	2.26
Corn cutlet	47.46	6.49	1.48	42.06	1.37	2.59
Soup	36.49	7.72	3.79	44.59	4.28	4.18

moringa can be easily prepared under optimized condition. The various parameters such as moisture, crude protein, fat, carbohydrate, total ash and crude fibre were analyzed.

Since in country like India approximately 60% women are suffered from joint pain, hence the moringa leaves products can be introduced to the women.

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