



Moringa oleifera SOUP

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Abstract

Moringa oleifera (Moringaceae) is a highly valued plant, distributed in many countries of the tropics and sub-tropics. It has an impressive range of medicinal uses with high nutritional value. *Moringa* is considered as one of the world's most useful plant as per available literature and thus all the plant parts is widely used in curing various ailments like antibiotic, anti-hypertensive, anti-spasmodic, antiulcer, anti-inflammatory, anti-asthmatic, hypocholesterolemia and hypoglycemic. Moreover, leaves of this plant being rich in protein may serve in combating the protein energy malnutrition for the undernourished population of world. Our studies have confirmed some useful importance of *Moringa* in context of its nutritional as well as its medicinal properties. Addition of small amount of leaf powder was not reflected any significant and disagreeable effects on the taste of a foods but improved the nutritional aspects on its incorporation. Reduction in water activity by decreasing the moisture content through the process of dehydration is followed in order to improve the shelf life and availability of this underutilized plant. Efforts are in way to develop the process and products to make available in the form of more acceptable and at the reach to the consumer at least to the under developed and developing countries for the inherent cited purposes. Under present investigation, we are representing the successful trials provided to the fresh leaves. This developed shelf-stable leaf flakes were characterized and possible uses on the basis of nutritional aspects in various foods like soup, sauces and other culinary have been cited.

Key words: *Moringa* leaf, Spices, Soup and Herbs.

1. Introduction

Moringa oleifera (Lam) commonly known as Drumstick, Horse radish, Murungai, Soanjna, Shajna and Sainjnais often referred as "mother's best friend" is a plant found wide applications in food and allied fields due to rich source of diverse range of nutrients and bioactive materials. Soup is generally a liquid warm food. It is used for many purpose like an appetizer, for treating cold and cough, to keep our body warm from cold, to get freshness form work stress, for to maintain the healthy diet, for sore throat etc. *Moringa* leaf typically low in calories, low in fat, high in protein per calorie, high in dietary fiber, high in iron and calcium,

and very high in phytochemicals such as Vitamin C, carotenoids, lutein, folate as well as Vitamin K. Dark green leafy vegetables are, calorie for calorie, probably the most concentrated source of nutrition of any food. They are a rich source of minerals (including iron, calcium, potassium, and magnesium) and vitamins, including Vitamins K, C, E, and many of the B vitamins. They also provide a variety of phytonutrients including beta-carotene, lutein, and zeaxanthin, which protect our cells from damage and our eyes from age-related problems, among many other effects.

2. Literature Review

Moringa oleifera

A Review of the Medical Evidence for Its Nutritional, Therapeutic, and Prophylactic Properties. Part 1. Jed W. Fahey, Sc.D. *Moringa*

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oleifera, or the Horseradish tree, is a pan-tropical species that is known by such regional names as Benzolive, Drumstick tree. Over the past two decades, many reports have appeared in mainstream scientific journals describing its nutritional and medicinal properties. Its utility as a non-food product has also been extensively described, but will not be discussed herein, (e.g. lumber, charcoal, fencing, water clarification, lubricating oil). As with many reports of the nutritional or medicinal value of a natural product, there are an alarming number of purveyors of “healthful” food who are now promoting *Moringa oleifera* as a panacea. While much of this recent enthusiasm indeed appears to be justified, it is critical to separate rigorous scientific evidence from anecdote. Those who charge a premium for products containing *Moringa* spp. must be held to a high standard. Those who promote the cultivation and use of *Moringa* spp. in regions where hope is in short supply must be provided with the best available evidence, so as not to raise false hopes and to encourage the most fruitful use of scarce research capital. It is the purpose of this series of brief reviews to:

- a) Critically evaluate the published scientific evidence on *Moringa oleifera*.
- b) Highlight claims from the traditional and tribal medicinal lore and from non-peer reviewed sources that would benefit from further, rigorous scientific evaluation.
- c) Suggest directions for future clinical research that could be carried out by local investigators in developing regions.

Phytochemical, Nutritional and Antibacterial properties of *Moringa oleifera*

Phytochemical, nutritional and antibacterial properties of dried leaf powder of *Moringa oleifera* (Lam) from Edo Central Province, Nigeria (Doss *et al.*, 2009). Phytochemical, nutritional and antibacterial properties of the dried leaf powder of *Moringa oleifera* used as food supplement, or source of vegetable in soup preparation were investigated in this study. The phytochemicals identified in the leaf powder included tannins, saponins, alkaloids, phenols flavonoids and glycosides.

The nutritional investigations revealed the presence of carbohydrates (29.08 %), ascorbic acid (140 mg/100 g); fibre (2.1 %), protein (6.88 %) as well as iron (70 mg/100 g), calcium (1530 mg/100 g), vitamin C (17.8 mg/100 g), potassium (255 mg/100 g), magnesium (250 mg/100 g) and vitamin A (19.9 mg/100 g). These have far reaching nutritional importance in the health care system in these localities whose childhood malnutrition of 6 - 9 year old is 18 compared to the South-South average of 12.8. The zones of inhibition were very low or non-existence when tested against *Staphylococcus aureus* (7 cm), *Pseudomonas* sp. (No zone), *Klebsiella* (No zone), and *Escherichia coli* (No zone). The dry leaf powder is a good source of phytochemicals/secondary metabolites and nutrients but not antimicrobials. The use of *Moringa* leaves as nutrient should therefore be encouraged in this locality (Mensah *et al.*, 2012).

***Moringa oleifera*: A Natural Gift**

Moringa oleifera, Lam (Syn *M. pterygosperma* Gaertn) usually mentioned in literature as *Moringa*, is a natural as well as cultivated variety of the genus *Moringa* belonging to family Moringaceae. It is one of the richest plant sources of Vitamins A, B (Singh and Prasad, 2013), C, D, E and K. The vital minerals present in *Moringa* include Calcium, Copper, Iron, Potassium, Magnesium, Manganese and Zinc. It has more than 40 natural anti-oxidants. *Moringa* has been used since 150 B.C by Ancient Kings and Queens in their diet for mental alertness and healthy skin. The leaves, pods, seeds, gums, bark and flowers of *Moringa* are used in more than 80 countries (including Pakistan) to relieve mineral and vitamin deficiencies, support a healthy cardiovascular system, promote normal blood glucose levels, neutralize free radicals (thereby reducing malignancy), provide excellent support of the body's anti-inflammatory mechanisms, enrich anaemic blood and support immune system. It also improves eyesight, mental alertness and bone strength. It has potential benefit in malnutrition, general weakness, lactating mothers, menopause, depression and therapeutic use osteoporosis. It is also used to



make an efficient fuel, fertilizer and livestock feed. *Moringa* is an edible extremely safe plant. Its tree could easily and cheaply be cultivated and grown in Pakistan. We need to explore therapeutic, nutritional and benefit of this gift of nature reported to be one of the world's most useful trees (Mensah, 2012; Sindhu *et al.*, 2013).

Effect of Dehydration on the Nutritive value of Drumstick leaves

Mehta Food based strategy is used as a tool for combating micronutrient deficiencies. It is also referred as dietary modification, which encompasses a wide variety of intervention that aim at increasing the production, availability and consumption of food products, which are rich in micronutrients. One such food products are green leafy vegetables (Morton, 1991). There are

many varieties of green leafy vegetables which are though rich in micronutrients, but are usually discarded or are not used for human consumption. One such leaf, a rich source of micronutrients but still under exploited is drumstick leaf (*Moringa oleifera*). The present study was done with the objective to assess the effect of different methods of drying (sun, shade and oven drying) on the nutritive value of the selected leaf with its fresh counterparts. The results showed significant increase ($p < 0.01$) in all the nutrients in the dried samples of the leaves making them a concentrated source of nutrients. Shade dried samples had highest nutrient retention followed by sun drying and oven dried samples but the difference was not statistically significant ($p > 0.05$) (Gaertn, 2001; Razis *et al.*, 2014).

Nutritive value of *Moringa* leaf

Table – 1: Proximate composition of dehydrated *Moringa* leaf (per100gleafflakes)

Nutrient	Fresh leaves	Sundried sample%	Shadow dried sample%	Oven dried sample%
Moisture (%)	75.9	6	6	6
Energy(kcal)	92	268.56(65.74)	271.83(66.15)	271.54(66.12)
Protein(g)	6.7	23.42(71.39)	23.66(71.68)	23.78(71.82)
Carbohydrate(g)	12.5	27.98(55.33)	28.476(56.10)	28.323(55.86)
Fat(g)	1.7	6.987(75.66)	7.032(75.81)	7.014(75.76)
Fiber(g)	0.9	11.3(92.04)	12.1(92.56)	11.8(92.37)

Table – 2: Mineral composition of dehydrated *Moringa* leaf (per 100 g leaf flakes)

Nutrient	Fresh leaves	Sun dried sample%	Shadow dried sample%	Oven dried sample%
Iron(mg)	0.85	21(95.95)	24(96.45)	19(95.52)
Calcium(mg)	440	3382(87.44)	3405(82.88)	3467(82.06)
Phosphorus(mg)	70	203(65.51)	218(67.89)	215(67.44)

3. Materials and Methods

Preparation of the Leaves for Drying

Sorting

Fresh *Moringa oleifera* leaves were collected from the farmers in the village over inspection and testing fresh, green, un-damaged, non - insect infested leaves are selected. Bruised,

discoloured, decayed and wilted leaves were discarded before washing the leaves, as decayed and wilted leaves give a bad flavour to the whole batch. Besides decayed and wilted, leaves can also lead to loss of nutrients too.



Washing

The stalks of the leaves were cut from the main branches and the leaves were washed thoroughly three to four times with plenty of water to remove all the adhering dust, dirt particles. After washing the stems of the leaves were tied together in small bunches and was hung in an airy space to drain away extra water and to air - dry the leaves. The residual moisture was evaporated at a room temperature, before the actual drying process on a clean paper with constant turning over to avert fungal growth. After air drying, all the stems and branches of the leaves were removed and only the leaves were used for drying.

4. Results

At first, we used 50% of *Moringa* leaf flakes (i.e.1.5g) in 75ml of water and gave for tasting. Results are given below

Characteristics	1	2	3	4
Taste	Bitter	Bitter	Bitter	Bitter
Odour	Leaf smell (heavy)	Leaf smell (heavy)	Leaf smell (moderate)	Leaf smell (heavy)
Appearance	Apple green	Apple green	Apple green	Apple green
Mouth feel	Stringent	stringent	Stringent	Stringent
Overall acceptability	6/10	7/10	5/10	6/10

Then we took 25% of *Moringa* leaf flakes (i.e.0.75gms) in 75ml of water and gave for tasting. Results are given below.

Characteristics	1	2	3	4
Taste	Slight bitter	Bitter	Bitter	Bitter
Odour	Good	Good	Pleasant	Good
Appearance	Forest green	Sea green	Apple green	Forest green
Mouth feel	Better	Better	Better	Better
Overall acceptability	7/10	7/10	6/10	7/10

Then we took 16% of *Moringa* leaf flakes (i.e.0.50g) in 75ml of water and gave for tasting. Results given below

Shadow drying

The air - dried leaves were spread on cotton sheets but instead of keeping them on the roofs the leaves were kept in the room only. The room selected for shadow drying was well ventilated. Natural current of air was used for shadow drying the leaves. It took about six days for the leaves to dry completely and become crisp and brittle to touch.

Leaf flakes

After drying, the leaves were made into flakes by using mixer and stored in air tight container.

Packing

We have packed *Moringa* leaf flakes in the dip bag made of wheat jute materials.



Characteristics	1	2	3	4
Taste	Good	Good	Good	Good
Odour	Pleasant	Pleasant	Pleasant	Pleasant
Appearance	Leaf green	Leaf green	Leaf green	Leaf green
Mouth feel	Nice	Nice	Good	Pleasant
Overall acceptability	9/10	9/10	8/10	9/10

After the above results, we have decided to add 16 % of *Moringa* leaf flakes in 3g soup pouch. In order to increase the nutrition value of the soup we also added some additives.

5. Additives

Spices, Herbs and others

6. Conclusion

According to our study, the results illustrate that, consuming *Moringa* leaf soup is good for health. Leaves can be given to infants and growing children and serve as a good tonic. However, it may be difficult for children to eat them naturally, as they are bitter. But we removed the bitterness of leaves by adding some spices and additives. So, it is not difficult for children to drink the soup. Consuming of these leaves soup daily is highly nutritious. Because generally the drumstick leaves are the most nutritious part of the plant, being a significant source of vitamin B6, vitamin C, pro vitamin A as beta-carotene, magnesium and protein. Drumstick leaves are more effective for growing kids in providing minerals for strong bones and teeth. Iron is also present in high value, which can be a great dietary supplement for anaemic patients. This underutilized plant could further be justified as mother's best friend plant to combat the associated problems of under developed and developing countries. The findings of the present study concluded that *Moringa oleifera* Soup is effective in improving the hemoglobin level among antenatal mothers. It is also a simple, safe, cost effective and non-pharmacological method which could be easily prepared anybody at home and it does not cause any side effects. Hence, the *Moringa oleifera* soup administration can be incorporated as an effective method in management of anemia and

add on nutritive supplementation among Antenatal Mothers. This may be promoted in the community as a prophylactic and dietary Supplementation for anemia.

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