

Original Research Article

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Study on Nutrients, Mineral and Vitamin Profile of *Moringa oleifera* Leaf Meal

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ABSTRACT

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The nutrient, minerals and vitamin analysis of *Moringa oleifera* leaf meal (MOLM) was analyzed in this study. *Moringa* leaves were harvested from different parts of Namakkal district of Tamilnadu. Stem and branches were cut from *Moringa* trees and spread out under the shade to dry at 35°C for seven days. The leaves were then removed manually, grounded into powder and preserved for use. The proximate analysis of sample for moisture, crude protein, crude fibre, ether extract, total ash was done as per the AOAC (1995). The nutrient composition of leaves recorded as; Moisture (5.36 %), crude protein (26.01 %), ether extract (6.58 %), crude fibre (7.08 %) and total ash (9.41 %). The mineral analysis revealed that high in Calcium (1.60%), Potassium (1.38%), Iron (285ppm), Zinc (38.02ppm), Copper (5.90ppm). The vitamin analysis revealed that vitamin C (17.31mg) and vitamin E (113.70mg) respectively. The result of nutrient, mineral and vitamin analysis of MOLM showed, MOLM can be used in the livestock and poultry diets with high protein and mineral value.

Introduction

The need to develop cheap and readily available alternative feeding material to support animal growth has become imperative. All parts of herbaceous plants as food by humans and animals, whole or in parts are generally considered as vegetables.

Vegetables include leaves, stems, roots, flowers, bulbs, seeds and fruits. Vegetables contain water soluble vitamins like vitamin B and vitamin C, fat soluble vitamins including vitamin A and D and also contain a great variety of phytochemical constituents which have being claimed to have antioxidant,

antibacterial, antifungal, antiviral and ant carcinogenic properties (Aja *et al.*, 2013).

Moringa oleifera Lam. is a fast growing, drought – resistant tree and widely cultivated species of the *Moringaceae* family in tropical and subtropical countries. It is grown in India, Africa, South and Central America, Mexico, Hawaii, and throughout Asia and Southeast Asia. It has high biomass production of up to 2-4 ton/year/acre and height that ranges from 5 to 10 m (Fahey, 2005). It can survive in harsh climatic condition including destitute soil without being much affected by drought. It can tolerate wide range of rainfall requirements estimated at 250 mm and

maximum at over 3000 mm and a pH of 5.0 to 9.0. *Moringa oleifera* is referred to as the 'drum stick tree' or the 'horse radish tree', whereas in others, it is known as the kelor, marango, mlonge, moonga, mulangay, saijhan, sajna or Ben oil tree (Anwar and Bhangar, 2003). Every part of the *Moringa oleifera* tree, from the roots to the leaves has beneficial properties. It is a multipurpose tree, various parts of which are used as fodder, herbal medicines, spices, food, natural coagulant, nectar forbees, fuel and fertilizer.

It possesses important medicinal properties which include antibacterial and antifungal activities (Nickon *et al.*, 2003) hepato protective (Pari and Kumar, 2002) and anti-oxidant, anti-inflammatory, anti-ulcer, anti tumor, hypocholesterimic activity. The leaves, flowers and pods are used as good sources of vitamins A, B, C, and minerals Ca, K, Mg, Fe, Zn, Mn, P, Zn, Na, Cu, and Fe.

The leaves are rich in carotene, iron and ascorbic acid. *Moringa oleifera* leaves have wide range of medicinal value including growth promotion and antimicrobial effect (Mbikay, 2012 and Moyo *et al.*, 2011). Leaves of the *Moringa* tree are the preferred part for use in animal diets as leaf meal. Therefore the objective of the study was to determine the nutritional value of *Moringa* leaves would help to prepare data for feed supplements and alternative non- conventional feed ingredients for animals while the functional properties would assist in predicting the behaviour of nutrients in feed formulation.

Materials and Methods

Collection and processing of *Moringa oleifera* leaves

The *Moringa oleifera* leaves were randomly collected at ten places in Namakkal district of Tamil Nadu. The plant was authenticated at

the Botanical survey of India, Coimbatore, and Tamil Nadu. Stem and branches were cut from *Moringa* trees and then leaves spread out under the shade to dry at 35°C for 7 days. The leaves were then removed manually, grounded into powder and preserved for experimental use.

Proximate analysis of *Moringa oleifera* leaf meal (MOLM)

The proximate analysis of *Moringa oleifera* leaf meal were moisture content, crude fibre, crude protein, Total ash and ether extract content were analysed by as per the standard method (AOAC, 1995).

Mineral analysis of MOLM

The mineral analysis of MOLM for calcium, phosphorous, Magnesium were analysed as per AOAC (1995). Sodium, potassium were determined by flame photometer while Atomic Absorption Spectrometer (AAS) was used to determine iron, zinc, copper (AOAC, 2005).

Vitamin analysis of MOLM

The B-complex and other water soluble vitamins determined included B1, B2, B3, and C, Fat soluble vitamins analysed were vitamin E (McMurray *et al.*, 1980; Thompson and Duval, 1989).

Results and Discussion

The nutrients like moisture, crude protein, crude fibre, ether extract, total ash content in *Moringa olifera* leaf meal (MOLM) was given in the Table 1.

The samples contain considerable amount of crude protein (26.01 %) and ether extract (6.58 %), crude fibre (7.08 %), total ash (9.41 %) and moisture (5.36 %).

Table.1 Nutrient composition of *Moringa oleifera* leaf meal (on DMB)

Field	Moisture (%)	Total ash (%)	Crude Fibre (%)	Crude Protein (%)	Ether Extract (%)
Ladhuvadi	4.70	9.80	7.00	25.80	8.39
Mecheri	5.10	9.20	6.50	26.50	5.20
Serapatty	4.00	8.80	7.21	25.80	6.30
Elurpatty	6.20	9.80	6.40	24.30	7.30
Mohanur	4.20	10.10	7.50	26.30	6.80
Valaiyapatty	8.00	7.90	7.82	25.40	5.10
Senthamangalam	7.20	9.50	6.30	27.61	7.10
Kattupudhur	4.20	8.60	8.20	26.20	8.60
Paramathiveelur	4.60	10.20	6.80	25.90	5.30
Thuraiyur	5.40	10.20	7.02	26.30	5.70
Average	5.36±0.43	9.41±0.24	7.08±0.19	26.01±0.26	6.58±0.40
Pooled sample	7.00±0.26	10.12±0.16	6.51±0.30	26.52±0.21	6.81±0.18

Table.2 Mineral and Vitamin composition of *Moringa olifera* leaf meal (per 100 g of leaf meal)

Nutrient	Level
Calcium (%)	1.60
Phosphorous (%)	0.28
Magnesium (%)	0.43
Sodium (%)	0.12
Potassium (%)	1.38
Iron (ppm)	285
Zinc (ppm)	38.02
Copper (ppm)	5.90
Vitamin B1 (mg)	2.64
Vitamin B2 (mg)	20.50
Vitamin B3 (mg)	8.20
Vitamin C (mg)	17.31
Vitamin E (mg)	113.70
Beta carotene (mg)	16.32

The mineral and vitamin composition of MOLM given the Table 2.

The mineral composition in the present study revealed that MOLM has good source of calcium, Potassium, Iron and Zinc. Similarly, good source of Vitamin C and E.

The average protein content in MOLM was 26.01 percent and similarly other authors expressed the crude protein value between 12.67 to 30.76 per cent (Lakshipriya *et al.*, 2015). The high level of protein in MOLM revealed that MOLM can be used as protein source in livestock ration especially for poultry

in the place of conventional protein ingredients.

The mineral and vitamin profile of MOLM in the present study shown that MOLM has rich in calcium, Zinc, Iron and Potassium. Similar observation also made by Zanu *et al.*, (2012). Like minerals, MOLM rich in Vitamin C, E and beta carotene. Similar findings also reported by Lakshmi Priya *et al.*, (2015) and Ali (2014).

The results of present study revealed that *Moringa oleifera* leaf meal contains an appreciable amount of crude protein, crude fibre and ether extract serving as a good source of protein for livestock and poultry. Similarly MOLM also contains high amount of calcium, potassium, iron, zinc and vitamin like vitamin C and E. It can be concluded thus *Moringa oleifera* leaf meal can contribute significantly to the nutrient requirement of livestock species.

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