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**Neetu Sonkar**

MVSc. Scholar, Livestock Production and Management Department, College of Veterinary Science & A. H., Chhattisgarh Kamdhenu Vishwavidyalaya, Anjora, Durg, Chhattisgarh, India

**Nishma Singh**

Assistant Professor, Livestock Production and Management Department, College of Veterinary Science & A. H. Chhattisgarh Kamdhenu Vishwavidyalaya, Anjora, Durg, Chhattisgarh, India

**Ashutosh Dubey**

Ph.D. Scholar, Livestock Production & Management Department, College of Veterinary Science & A.H. Chhattisgarh Kamdhenu Vishwavidyalaya, Anjora, Durg, Chhattisgarh, India

**Anupam Soni**

M.V.Sc. Scholar, Livestock Production and Management Department, College of Veterinary Science & A. H., Chhattisgarh Kamdhenu Vishwavidyalaya, Anjora, Durg, Chhattisgarh, India

**Lok Prakash Verma**

M.V.Sc. Scholar, Department of Veterinary and Animal Husbandry Extension, GBPUAT, Pantnagar, Uttarakhand, India

**Sudheer Bhagat**

M.V.Sc. Scholar, Livestock Production and Management Department, College of Veterinary Science & A. H., Anjora, Durg, Chhattisgarh, India

**Roshan Kumar Sahu**

M.V.Sc. Scholar, Animal Nutrition Department, College of Veterinary Science & A. H., Anjora, Durg, Chhattisgarh, India

**Corresponding Author:****Neetu Sonkar**

MVSc. Scholar, Livestock Production and Management Department, College of Veterinary Science & A. H., Chhattisgarh Kamdhenu Vishwavidyalaya, Anjora, Durg, Chhattisgarh, India

## Use of *Moringa oleifera* as a poultry feed: A short note

**Neetu Sonkar, Nishma Singh, Ashutosh Dubey, Anupam Soni, Lok Prakash Verma, Sudheer Bhagat and Roshan Kumar Sahu**

**Abstract**

Poultry production plays important socio-economic roles in developing countries. However, poultry production sectors are facing some problems, one of which is an increase in the cost of feed. Researchers are therefore looking for cheap, available, and safe alternative sources of protein. Some tropical legumes and plants were introduced into poultry diets as protein sources to decrease the cost of the feed. *Moringa oleifera* which is a member of the Moringaceae family, distributed in many tropical and subtropical regions of the country. It has excellent nutritive value and therapeutic properties. *Moringa oleifera* is known to be good source of protein, amino acids, minerals, vitamins,  $\beta$ -carotene and various phenolics. The purpose of this notes to explain the possibilities of usage *Moringa oleifera* in poultry nutrition by revealing its nutritional importance.

**Keywords:** *Moringa oleifera*, poultry feed,  $\beta$ -carotene

**Introduction**

Chickens are important and cheap source of animal protein therefore poultry production plays important socio-economic roles in developing countries [15]. In most developing countries, poultry production sectors are facing the problems of increasing the feed cost which is 60-70% of this production cost [26]. The purpose of modern poultry production systems is to obtain maximum profit at minimum production cost. This situation has created need to look for cheap, locally available and less competitive substitutes to some ingredients of poultry feed and in particular, sources of protein [7]. In this context, *Moringa oleifera* leaves may be best alternative protein source. *Moringa oleifera* leaves, stem, bark, flowers, fruits and root have nutritional and pharmacological properties. Especially, the leaves of *Moringa oleifera* are highly nutritious than other part of the tree, owing a good source of quality protein,  $\beta$ -carotene, all essential amino acids, vitamins, minerals and various phenolic compounds [14, 9]. Various researches were conducted to study the effect of *M. oleifera* leaf meal on the growth performance of layer chicks [15], on the productive performance of laying hens [10], and broilers with successful results [1].

**Nutrients in *Moringa oleifera***

*M. oleifera* is rich in nutrient containing least anti-nutritional factors is used as an alternative to livestock feed. Nutritional evaluation of different parts of plant like leaves, seeds and stems of the plant demonstrate that they are abundant in protein, essential amino acids, minerals, vitamins and other bioactive compounds [17, 27]. There are still scanty reports about the nutrient composition of roots of this plant. The nutrient content of different part of *M. oleifera* are summarized in the Table1. The leaves and seeds carry large amounts of essential minerals, vitamins, amino acids, and fatty acids [18]. Additionally, It is reported that *M. oleifera* leaves have about 16 to 19 amino acids, out of which 10 are classified under essential amino acids viz. threonine, tyrosine, methionine, valine, phenylalanine, isoleucine, leucine, histidine, lysine and tryptophan. *M. oleifera* leaves have been reported to be higher calcium, potassium, magnesium and iron contents. It has been observed that the amount of vitamins A, B, C and E in the *M. oleifera* leaf is also high [23] It has also been reported that other parts of the *M. oleifera* plant such as roots, stems, flowers and fruits contain a rich proximate, mineral, vitamins and fatty acids profile [25].

**Table 1:** Proximate composition of *Moringa oleifera* (% dry matter basis)

Proximate composition	Range (low–high)*		
	Leaf	Seed	Stem
Protein	10.74 <sup>a</sup> –30.29 <sup>b</sup>	9.98 <sup>c</sup> –51.80 <sup>d</sup>	12.77 <sup>e</sup>
Fat	6.50 <sup>b</sup> –20.00 <sup>c</sup>	22.97 <sup>g</sup> –38.67 <sup>f</sup>	2.0 <sup>e</sup>
Crude fibre	7.09 <sup>g</sup> –35.00 <sup>c</sup>	20.00 <sup>c</sup> –22.93 <sup>g</sup>	–
Ash	7.64 <sup>a</sup> –10.71 <sup>b</sup>	3.60 <sup>j</sup> –5.00 <sup>c</sup>	8.41 <sup>e</sup>
Carbohydrate	13.41 <sup>c</sup> –63.11 <sup>g</sup>	18.00 <sup>c</sup> –40.09 <sup>g</sup>	–

References: a- Valdez-Solana *et al.* 2015 [27]; b- Moyo *et al.*, 2011 [16]; c- Aja *et al.*, 2013 [4]; d -Ochi *et al.*, 2015 [20]; e - Shih *et al.*, 2011 [25]; f- Olagbemide and Philip, 2014 [21]; g – Mabusela *et al.*, 2018 [12].

### Effect of various level of moringa leaf meal on the laying hen's performance

Researches have been found to improve poultry production at a low feed cost by the application of *Moringa oleifera* leaf meal in poultry diet [1]. Recent studies have reported that the addition of *M. oleifera* leaf powder in poultry diets increases the egg production as well as quality of eggs in poultry birds [8, 11]. It has been reported that the addition of 2.5 and 5% of *M. oleifera* leaf powder in layer birds diet increases the egg number per week, egg weight, egg width, egg surface, yolk height, yolk weight, albumen weight and yolk ratio as compared to the control diet [6]. Kakengi *et al.* (2007) [10] reported that when 5% *M. oleifera* leaf powder was used as a replacement to sun-flower seed meal in layer diet, there was significant increase ( $P < 0.05$ ) in egg weight. It has been found that when 5% level of *M. oleifera* leaf powder include in layer ration it significantly improved the yolk colour and protein absorption there was no harmful effects on the laying performance when compared to the control diet [11]. Similarly, various studies reported that *Moringa oleifera* leaf meal could be acceptable up to 10% -15% in laying hen rations [10, 3].

### Effect of inclusion of moringa seed on laying hen's performance

Inclusion level of 1, 3 and 5% *M. oleifera* whole seed meal in layer hens feed showed significantly enhanced egg yolk colour, but significantly decreased body weight, feed intake, the rate of egg laying, egg weight, and egg mass. Therefore its inclusion at these levels is undesirable [12].

### Effect of inclusion moringa leaf meal on the performance of broilers

It has been reported that the broiler chickens fed *M.oleifera* leaf meal at the rate 1, 3 and 5% of DM intake showed significantly higher body weight gain, average daily gain and higher feed conversion ratio than control group [19]. David *et al.* (2012) [5] reported to improve the growth performance and carcass yield of broilers when two levels (0.05% and 0.1%) of moringa leaf powder added in broiler rations. On the opposing, Makanjuola *et al.* (2014) [13]; Onunkwo and George (2015) [22] did not report any significant differences in the body weight gain and feed intake of broiler chickens fed *M. oleifera* leaf meal as compare to control group when *M. oleifera* included at 200, 400 and 600 g respectively in 100 kg of feed. Pagua *et al.* (2014) [24], reported that the addition of moringa leaf powder on broiler diets did not significantly influence the broiler's feed intake, body weight gain, feed conversion ratio, final weight, feed cost per kg of broiler produced and income over feed and chick cost. These studies showed that *M. oleifera* leaf meal doesnot haveany harmful effects on growth performance and can be used as rich protein

source in poultry diets.

### Effect of inclusion of moringa seeds on the performance of broilers

To study its effect on performance and carcass characteristics included *Moringa oleifera* undecorticated seed powder in the broilers diet at the rate 0%, 0.37%, 0.75%,and 1.5%, They revealed that during the starter period (8–21 days), use of 1.5% *Moringa oleifera* undecorticated seed powder significantly ( $P < 0.05$ ) reduced weight gain, body weight, and feed efficiency. During finisher (22–35 days) and whole (8–35 days) periods, supplementation of different levels (0.37%, 0.75%, and 1.5%) of *oleifera* undecorticated seed powder failed to produce a significant ( $P > 0.05$ ) effect on weight gain, final live body weight, feed efficiency, dressing percentage, and liver and heart weights [2]. Therefore, use of *oleifera* undecorticated seed powder at an amount of 1.5% during the finisher period controls its detrimental effect during the starter period. Therefore, it is beneficial to use this level during the finisher period only.

### Conclusion

Previous studies illustrated that *Moringa oleifera* leaf meal could partially replace expensive protein sources such as soybean meal, sunflower seed cake and fish meal. Moringa leaf meal can be used safely up to 20% level in broiler diets and up to 10% in layer diets without deleterious effects on performance. Moringa undecorticated seed powder can also be used in amounts of up to 1.5% of the diet of broilers only during the finisher period, not during the starter period.

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