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**IMPROVED TECHNOLOGY: A KEY STRATEGY FOR  
ENHANCED LIVESTOCK PRODUCTIVITY  
AND NATIONAL ECONOMIC DEVELOPMENT**

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**Odunsi, A. A., Dairo, F.A.S., Oluwafemi, R. A., Akande, K. E and  
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## African mesquite (*Prosopis africana*): a potential non-conventional feed resource for poultry

\*Akande, K.E. and Alabi, O.J.

Department of Animal Production, Federal University of Technology Minna, Niger State, Nigeria.

\*Corresponding Author E-mail: kemi777akande@gmail.com

### Abstract

The keen competition between the human populace and livestock industry for grains as well as the problem of grain scarcity because of the decline in production as led to the search for alternative feed resources which are not conventional. In light of this challenge, this paper presents a review of research work on the utilization of African mesquite (*Prosopis africana*) a potential non-conventional feed resource (NCFR) for poultry feeding. Utilization of non-conventional feed resources is one way of achieving sustainable livestock production, to cushion the effect of shortages in animal feedstuff and thereby ensuring a level of nutritional security. African mesquite is a useful multipurpose leguminous tree. The proximate composition as well as the successful inclusion of processed seed meal of African mesquite in chicken diets have been reported by some researchers. The proximate composition of African mesquite seed; crude protein for raw seeds is in the range of 20.50 to 27.67% while that of the processed seeds is from 20.54 to 23.60 %. Crude fibre is within the range of 6.90 to 12.10% and 3.03 to 6.51% for raw and processed seeds, respectively. Ether extract value for raw seeds is between 4.56 and 6.46% whereas the processed seeds range from 3.60 to 12.93%. Ash value is from 4.04 to 6.05% and 4.40 to 5.67% for raw and processed seeds, respectively.

**Keywords:** African mesquite, non-conventional feed resource, poultry

### Description of Problem

There have been growing concerns about the ever-expanding gap existing between feed available and feed required by livestock. This glaring shortage to meet up with the growing livestock population is an alarming challenge, an imminent problem that requires urgent attention. Animal scientists and nutritionists are still searching and conducting research on the nutritional potentials of non-conventional feed resources for future inclusion in livestock feed in commercial-scale [1], [2]. Additionally, the optimum level of inclusion of these non-conventional ingredients will also be determined.

Utilization of non-conventional feed resources is one way of achieving a sustainable livestock production, to cushion the effect of shortages in animal feedstuff and thereby ensuring a level of feed security. Nigeria possesses a vast array of NCFR (trees, shrubs, legumes) that can be used for livestock feeding. These feed resources have the potential in the alleviation of the feed scarcity experienced during dry seasons, thus contributing to nutritional security. It noteworthy, that any substitute or alternative feedstuff resource should not be toxic, but should be palatable, nutritious, available, affordable and economical, with little or no competition between man and animal.

Due to this arising need, African mesquite seed is been put into consideration as a potential non-conventional feed resource as an alternative for its inclusion in poultry feed. African mesquite also called iron tree, is spread across the Sub-Saharan Africa region, a perennial legume tree that belongs to the *Fabaceae* family. It is one of the locally utilizable and under-exploited tropical plants. This tree plant is

commonly found in northern and north-central Nigeria and the seeds are produced in abundant quantities between February and August [3].

This legume tree can play a vital role in combating the problem of feed crisis in the livestock sector. The leguminous seeds from the tree can serve as a plant protein feed resource. It is also used for making special traditional soup condiments and can be utilized in mixed animal feed [3]. African mesquite contains amino acids at levels comparable with most common legumes [4]. This paper presents a review of research work on the utilization of African mesquite in poultry nutrition as a potential non-conventional feed resource.

### African mesquite a potential non-conventional protein feedstuff

African mesquite is a valuable multipurpose tree and it is considered a non-conventional protein feedstuff. Raw seeds of African mesquite contain antinutritional factors, nevertheless, proper processing reduces the levels of the toxic factors [5]. African mesquite seeds are good sources of carbohydrate, fibre and protein [6]. It is also a good source of potassium and magnesium. The seeds do not contain heavy metals like lead (Pb) and cadmium (Cd) at a detectable range. Additionally, African mesquite contains substantial quantities of most of the indispensable amino acids ([7]; [8]). It was found that processing (fermentation) enhances the total amino acid in African mesquite seeds ([4]; [8]). However, the seeds were found to be limiting the sulphur-containing amino acids, thus, their supplementation during feed formulation is required [5].

**Table 1: Proximate Composition of African mesquite seeds**

Proximate content	Quantity (%)	References
<b>Raw seeds</b>		
Dry Matter	96.08	
Crude Protein	22.62	
Crude Fibre	6.90	[10]
Ether Extract	6.46	
Ash	4.04	
<b>Raw seeds</b>		
Dry Matter	85.00	
Crude Protein	27.67	
Crude Fibre	10.00	[11]
Ether Extract	6.00	
Ash	5.00	
<b>Raw seeds</b>		
Dry Matter	92.40	
Crude Protein	20.50	
Crude Fibre	12.10	[5]
Ether Extract	4.56	
Ash	6.05	
<b>Processed seeds</b>		
Dry Matter	98.10	
Crude Protein	23.60	
Crude Fibre	3.30	[7]
Ether Extract	12.80	
Ash	4.40	
<b>Processed seeds</b>		
Dry Matter	95.49	
Crude Protein	20.54	
Crude Fibre	6.51	[3]
Ether Extract	12.93	
Ash	5.67	
<b>Processed seeds</b>		
Dry Matter	94.50	
Crude Protein	22.86	
Crude Fibre	11.50	[5]
Ether Extract	3.60	
Ash	4.95	

#### Utilization of African mesquite seed meal in poultry diets

The successful inclusion of processed seed meal of African mesquite in chicken diets has been reported by some researchers ([5]; [9]; [10]). [10] reported that total replacement of soya bean meal with decorticated fermented African mesquite seed meal in broiler diet had no negative effect on carcass yield. According to [9] replacement of 25% of sesame seed meal with soaked African mesquite seed

meal significantly increased final live weight and weight gain of broiler chickens as well as improved feed efficiency compared with other treatments. [5] reported that processing increased the crude protein of African mesquite while it decreased the crude fibre, ether extract and ash content. The authors found out that raw African mesquite contains high levels of tannins in the seeds, which can be significantly reduced with proper processing. On one hand, pullets fed raw African mesquites recorded

decreasing feed intake and weight gain with increasing levels of the seeds in the diet as well as a high mortality rate. While on the other hand, birds that were fed the processed seeds had significantly higher weight gain and feed efficiency which was similar to the control [5].

#### Proximate composition of African mesquite seeds

The proximate composition of African mesquite seeds as reported by some researchers is depicted in Table 1. The crude protein for raw seeds is in the range of 20.50 - 27.67% while that of the processed seeds is from 20.54 to 23.60%. Crude fibre is within the range of 6.90 to 12.10% and 3.03 to 6.51% for raw and processed seeds, respectively. Ether extract value for raw seeds is between 4.56 and 6.46% whereas the processed seeds range from 3.60 to 12.93%. The ash value is from 4.04 to 6.05% and 4.40 to 5.67% for raw and processed seeds respectively.

#### Conclusion and Application

Tree plants that serve as NCFR sometimes produce seeds that can be processed for feeding livestock. There is the possibility that these plants in the future may be used on a large scale in the Nigerian livestock industry. There is a need for supplementation of the limiting amino acids. An overview of proximate composition shows that African mesquite is a good source of feedstuff with a great possibility of dietary inclusion for poultry, notwithstanding proper processing is required before its inclusion in the diets of poultry.

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