

**Research article**

# **AWARENESS AND UTILIZATION OF UNCONVENTIONAL PROTEIN FEED RESOURCES IN FEEDING MONOGASTRIC ANIMAL IN SOUTH – SOUTH, NIGERIA.**

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## **ABSTRACT**

This study was conducted to determine the constraints involved in the awareness and utilization of unconventional protein feed resources in feeding monogastric animals in Delta South of Nigeria. The primary data used for the investigation were obtained using structured questionnaires given to 80 randomly selected farmers, through the assistance of Agricultural Development Project Staff. Simple descriptive statistical techniques such as frequency counts, relative frequency (96) means and other relevant statistical techniques. The result indicated low level of literacy awareness and utilization of unconventional protein feed resources in feeding their animals. Most of the respondents (80 %) still depends on conventional feeds. While (5 %) used privately compounded feeds. Only 5% of the farmers were using unconventional feeds. The results shows that under utilization of unconventional feeds accounts for high cost of production of monogastric animal by persistent use of conventional feeds in Delta Southern part of Nigeria. The major constraints faced by farmers were information dissemination, production incentive, processing facilities and awareness of chemical composition or physical properties of unconventional feeds like moisture content, oil content, amino-acid and anti-nutritional factors. **Copyright © WJABS, all rights reserved.**

**Keywords:** Unconventional feed, monogastric, awareness, anti-nutritional, conventional feed, and utilization.

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## INTRODUCTION

The realization that feeding alone currently accounts for over 75 % of the intensive monogastric animals (especially, poultry, swine and rabbits) production in the third world countries, including Nigeria, has stimulated research interest aimed at exploiting different locally available alternative feeding resource (Agede and Aletor, 2003). The high proportion of feeding cost in production cost is related to the cost of feeding ingredients. This is due to the unavailability and steep rise in the prices of conventional feed ingredients especially the energy and protein sources. The awareness and utilization of unconventional source of feed ingredient such as leafy plants, which can be incorporated into poultry, diet (Fasina *et al.*, 2004).

The growing foreign exchange difficulties and the debt servicing needs of some developing countries have contained them to cut down feed imports especially for mono-gastric animals (Sansoucy, 1993). This typical of our country (Nigeria) where importation of many agricultural produces has been banned or restricted by the Federal Government. This has affected the availability and cost of many of the conventional protein resources, especially those imported. According to Ly (1993), conventional protein sources in the tropics are not abundant, nor available in many cases for economic reasons. In contrast non-traditional protein sources including those arising from fermentative process are yet to be efficiently utilized in the tropics (Ly, 1993).

Mono-gastric animals, which are the animals with a simple stomach such as poultry, pigs and rabbits, have limited ability to utilize forages due to several factors such as fibre levels and the presence of toxic factors. Conventional feed resources are those feed resource that have been established for use in particular animals diets. This term is relative to place and the animal concerned. Conventional feed resource for ruminants may not be conventional for mono-gastric and conventional feed resource in a particular region or place like the temperate region may not be available for utilization in the tropics.

The unconventional feed resource is constantly on the increase as researchers reveal the potential of novel feed source. This has been confirmed by series of research into their utilization for feeding mono-gastric animals. The need to pay attention to this is hinged on the future of animal production in Nigeria. The long term growth of animal production in Nigeria is depended on a better awareness and utilization of unconventional feed products, which attract little or no monetary value (Tewe, 1997). According to Adeniyi and Balogun (2002), effort to reduce the high cost of feeds and therefore the cost of poultry, pig and rabbit products have concentrated on using feeds formulated from available and cheap alternatives.

In addition, unconventional feed resource holds the key to a sustainable animal's production, it was against this background, that this study was carried out to determine the constraints involved in the awareness and utilization of unconventional protein feed resources in feeding mono-gastric animal in South - South of Nigeria.

## MATERIALS AND METHODS

The study was conducted in Delta South senatorial zone of Nigeria between April, 2003 and March, 2004. The study area covered the five Delta South senatorial zones namely: Bomadi, Patani, Isoko North, Isoko South and Burutu Local Government Areas. In order to have a good spread of the respondents for this study, a random sampling was used to select ten small-scale mono-gastric animal farmers from each zone for this study through the assistance of Agricultural Development Projects Staff. Information pertaining to socio-economic characteristics of the small-scale farmers and existing mono-gastric animal farm operation in the study area was obtained through the method of participant observation. The questionnaire was pre-tested and modified before the final draft was prepared. Data collected were analysed using simple descriptive statistical techniques such as frequency counts, relative frequency (%), means and other relevant statistical techniques.

## RESULTS AND DISCUSSION

Some socio-economic characteristics are known to influence the awareness and utilization of unconventional protein feed resources in feeding mono-gastric animal. The variables analysed in this study include age, level of education, years of mono-gastric animal management experience, knowledge and feeding of mono-gastric animal. All the sampled farmers planted mixtures of cereals leguminous grains, and tree crops as mixed-cropping on the farm. The Delta Southern part of Nigeria is known to be characterized by mixed-cropping of unconventional protein cotton seed, cashew nut, Bambara groundnut and cowpea. The unconventional protein feed resources was reported to be classified into five groups such as foliar protein sources, oil seeds and pulses, small invertebrate organism, micro-biological and fermentative sources and lastly domestic and Agro-industrial waste (Devendra, 1993).

Table 1 show that 50 per cent of the sampled farmers were between the age brackets of 30 - 50 years. This reveals that majority of the sampled farmers were middle age. It implies that they are still in their economic active age which could result in a positive effect on production. The result agrees with other findings like Alabi *et al.*,

(2005), which show that farmer's age may influence awareness and utilization in several ways. The nature of influence of age on awareness and utilization of unconventional protein feed resource is indeterminate older farmers many have more resources that make it more likely for them to try new technologies.

On the other hand, it may be that younger farmers were more likely to be aware and utilized unconventional feeds than older farmers because of better education and more exposure to new ideas. Obeta *et al.*, (1991), in line with this believed that younger farmers are more flexible to new ideal and risk. They are expected to be aware and utilized unconventional feeds more readily than older ones. But it surprises that both are yet to be aware and utilize unconventional protein feed resources in feeding mono-gastric animals within their locality. This can be attributed to the lack of processing facilities to process fibre content, Amino acid profile and the presence of some anti-nutritional factors found in unconventional feedstuffs. Furthermore, 75 per cent of the sampled respondents had secondary education while 16.25 per cent had primary education. The remaining 8.75 per cent of the respondents had tertiary education.

The result indicated low level of literacy of awareness and utilization of conventional protein feed resources in feeding their animals. Some of the fanners (76.25 per cent) have been in management for between 11 - 30 years. This means that they must have acquired good experience in the production of unconventional feedstuffs. This increases the aware of unconventional feed stuffs existence to 95 per cent while the remaining 5 per cent of the farmers are only aware of its correct use. Most of the respondents (80 per cent) still depended on conventional feeds such as soya bean meal (SBM), Groundnut cake (GNC), Fish meal (FM) and palm kernel cake (PKC). While 15 per cent of the respondents used privately compounded feed. Only 5 per cent of the farmers were using unconventional feeds. The result shows that under utilization of unconventional feed accounts for high cost of production of mono-gastric animal by persistent use of conventional feed in Delta Southern part of Nigeria. Table 2 shows the major constraints that have affected the utilization of unconventional protein sources in Delta South of Nigeria.

Majority of the respondents (76.25 per cent) had their information through local meetings. While 15 per cent of the respondents received their information through farm magazine. The result shows that dissemination of meetings and farm magazine played a crucial role in limiting the utilization of these feed ingredients. In ensuring the effective utilization of these feed resources, dissemination of information on feed through publications, seminar, conference, networks and implementation of proven appropriate technologies through field projects are considered essential as reported by Sansorucy (1993). Majority of the producers are not aware of the potentials that lie in these feed resources, which are all around waiting to be topped and used in animal feeding.

About 87.5 per cent of the farmers had adequate production facilities to produced unconventional feedstuffs. While (12.5 per cent) of the respondents has access of good road to their farm. None of the respondents had processing facilities to process the unconventional feedstuffs. Devendra (1993) reports that the need for processing industries and good roads has been a hindrance in the utilization of these feed resources, the adoption for use of these ingredients or feed resources would require processing of sufficient quantities to meet the demand. He reported again that if processing industries could be established to produce these products, even as a by-product and good roads to aid in their transportation the change of status would be faster than it is and more feed ingredients would be available and utilized by producers.

Further analysis shows that only 32.5 per cent of the farmers had micro-credit facilities such as loan for production of unconventional feedstuffs. None of the farmers had laboratory facilities to carry out analysis of physical properties of unconventional feedstuffs. The result indicates that there is inadequate economic incentive, which could not attract people to the animal production sector. Soniaya (1995) reported that growth in the animal production industry would only increase when economic incentives is been given to animal producers in sufficient manner.

The awareness of chemical composition or physical properties of these feed ingredients are very important in their utilization. Some of the properties that have limited the utilization and call for concern include moisture contents, oil content, amino acid and anti-nutritional factor. Table 2 also shows that none of the farmers are aware of the physical properties of unconventional feeds. Moisture content is crucial in the storage and keeping value of the feed ingredients. It's also important in transportation as it would affect the cost of transportation due to its bulk, hence, affects the cost of feed ingredients, a typical example is the Brewers grain, which due to the cost of drying the wet grain and of transporting it from breweries to the drying establishment has translated into its high cost (Sonaiya, 1995). Drying of the feed ingredient should be useful, provided facilities are available and not too far from the source of the processing industries. The drying process should be done with care to prevent loss or damage to the protein which a labile.

Oil content of some of these feed resources is high and this could make them unqualified, as protein sources hence processing is important. High amount of oils affect the shelf-life of these resources and this is due to lipid oxidation that occurs (Chenost and Mayer, 1977). The oil extracted are valuable and could be used in as raw materials by the food processing, cosmetics and pharmaceutical industries. The demand for palm kernel oil, have greatly encouraged the production of the by-product (cake), which is utilized by the feed mill industry. The amino acid profile of some of these ingredients is not adequate while some with adequate profile may not give as good a performance as expected due to anti-nutritional factors. There is need for care in the treatment of these feed resources to ensure that the protein is not damaged. There would be need for supplementation and/or complementation of some of these

feed resources to ensure efficient utilization. These feed resource according to chenost and Mayer (1977), have a limitation of not being adequate in all the essential amino acid profile where lysine, methionine and cysteine seem to be often deficient.

Anti-nutritional factors have posed a major problem in the use of many of these unconventional feed resources. Some of these anti-nutritional factors, with the ingredients that contain theory can be seen in Table 3 while table 4 shows some of the processing methods that have been useful in the reduction of some of these anti-nutritional factors. These substances are a major factor limiting the extent of inclusion of many protein sources and their palatability as mono-gastric feed. Several treatments and processing have been useful in reducing the anti-nutritional factors and improving the utilization of these resources by monogastrics.

To increase utilization of legume grains by chickens, Robinson and Singh (2001) suggested that the grains should undergo treatment such as dehulling or supplementation of the diet with enzymes. Dehulling has been recognized to improve protein quality and digestibility of many legume seeds. This may not be unrelated to the presence of high tannin content in the seed coat. The worries of cooking and some other heating method are in the potential of it denaturing the proteins. Heat treatment has been widely used to improve the nutritional quality of grain legumes; the effect of heat may be specific for each legume and may depend on the concentration and location of the different heat-labile anti-nutritional factors. So much needs to be done in providing solution to this problem and thus improving the level of utilization of these feed resources in production of monogastric animals.

## CONCLUSION AND RECOMMENDATIONS

The more available feed ingredients for mono-gastric animal feeding, the likely it is for these animals to have their nutritional requirement. This is because there would be a great variety of ingredients to make the choice from and depending on the specific animal needs combination of these ingredients can be manipulated to satisfy these animal requirement. The low demand for many of these feed resources by man makes them an area of promise in the feed industry. Every animal nutritionist and producer needs to accept these ingredients and utilize them, as this would before long translated them into conventional feed resource. There is though a strong need for dissemination of information to create awareness on the various processing method for the various feed ingredients in an attempt to improve their utilization as protein sources.

Government and private sector should get involved in establishing processing industries for these feed resources to increase the volume available. They should also give credit facilities to small-scale farmers of mono-gastric animals in order to boost the animal feed industry and indirectly affect positively, animal production.

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TABLE 1: SOCIO- ECONOMIC CHARACTERISTICS OF SAMPLED FARMERS

Variable	N= 80 No of Respondent	Percentage %
<b>Age in years</b>		
21-30	08	10.00
31-40	54	67.50
41-50	10	12.50
51-60	08	10.00
61-70	-	-
<b>Level of education</b>		
Primary	13	23.75
Secondary	60	65.00
Tertiary	07	8.75
<b>Years of mono-gastric animal management experience</b>		
1-10	19	23.75
11-12	52	65.00
21-30	09	11.25
41-50	-	-
<b>Knowledge of unconventional feeds</b>		
Aware of its existence aware of its correct use	17	95.00
	04	5.00
<b>Feeding of monogastric animal</b>		
Unconventional feeds		
Privately compounded	04	5.00

Feeds	12	15.00
	64	80.00
<b>Total number of sampled</b>	<b>80</b>	<b>100</b>

Table 2: Major constraints in the utilization of unconventional protein feed resources.

Constraints	Variable	Number	(%)
Information	Neighbours Local Meeting farm	04 61	5.00 76.25
Dissemination	magazine cooperative society's members	1203	15.00 3.75
Available facilities	Production facilities	70 10	87.5
	Processing facilities Good road	-	12.5 -
Production incentive	Input facilities Credit	54 26	67.5
	facilities Laboratory	-	32.5 -
Nature of the ingredients used	Awareness of physical properties of unconventional feeds e.g. Moisture content Oil content		
	Amino-acid	-	-
	Anti-nutritional factor	-	-
		-	-

Source: Field Survey (2013)

Table 3: List of Some Unconventional Feed Resource and their Antinational Factor

Feed Resource	Anti-nutritional factor	Concentration
Jack beans Winged beans	Lection	73 units/ mg protein 40-
Lima beans Acacia Spp	“	320 unit/mg
Rapeseed (canola seed)	“	59 unit/mg protein
	condensed tannin	65 g/kg
	Glucosinolate	100 mmol/kg
Cotton seed Colton seed cake	Gossypo!	06-12 g/kg(free)
	“	0.05.0.22%
Leuceana seed	Mimosine	145 g/kg
Leuceana leaf	Mimosine	25 g/kg
Cowpea seed meal	Trypsin intubitor HCN	N.A*
Rubber seed meal	Oxalic acid Tannins	19 mg/100

Water hyacinth Banana	HCN	2.4% DM
leaf Cassava leaf		N.A.* 17. SMG/100 g

Source: Adopted from D' Mello, (1995), Devendra (1993). \*Not Available

Table 4: Some processing that have Been Useful in Reducing the Anti-nutritional Factor.

Source	Anti-nutritional	Suggested Treatment
Rubber seed	Cyanogenic gluo sides	Sundrying, Sundrying + Shredding
Cowpea	Trypsin inhibitor	Autoclaving, Dehulling + Soaking
Mucuna seeds	Protease inhibitor	Cracking + Soaking in Water + Cooking
Lotus caniculatus	Tannins Tannins	Genetic manipulation
Mango kernel Acacia Spp	Lectin, proteaeiin hibitor	Boiling Cracking + Soaking in Water + Cooking.
Cassava Leaves	Cyanogeric glucosides	Heat

Source: Adopted from Teguiá and Beynen (2005) and Olomu (1995)