



# NSAP

47<sup>th</sup> Annual  
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## CONFERENCE PROCEEDINGS

THEME  
SECURING ANIMAL  
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GLOBAL CHALLENGES

### PROXIMATE COMPOSITION OF SOME SELECTED ENERGY AND PROTEIN FEEDSTUFFS

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#### Abstract

The study was conducted in Bauchi, Bauchi State to determine the proximate composition of some selected energy and protein feedstuffs. Feedstuffs for the analysis of proximate composition were obtained from commercial markets across Jos, Bauchi and Adamawa States. The feedstuffs were first cleaned from any foreign materials, milled and screened to fine particle size (< 250 µm) and samples were analysed for proximate composition. Analyses were conducted at Rico Gadu Laboratory Mayo Belwa Local Government Area of Adamawa State and National Veterinary Research Institute, Vom. The feedstuffs analyzed were grouped into (4) classes; Plant protein sources, Animal protein sources, energy sources and anti nutritional factors. The results of the analysis showed that the plant protein feedstuff had an average of 90.30-97.42%DM, 14.41-51.10% CP, 4.90-20.96% CF, 3.8-11.31% EE, 4.90-16.28% ash, 28.55-58.00% NFE and 2740.82- 3229.20Kca/kgME. The Animal protein had an average 86.12-93.0% DM, 31.20-41.15% CP, 2.13-2.80% CF, 9.80-13.79% EE, 4.90-18.94%ash, 10.11-44.90% NFE, 3004.00-3527.45Kcal/kgME. The energy source had an average of 85.00-91.54% DM, 6.00-15.64% CP; 2.60-13.08% CF, 2.24-17.00% EE, 1.08-7.25% ash, 45.19-83.88% NFE and 2878.67-3438.90 ME. Some of the anti- nutritional factors analyzed revealed that Sunflower had 23.82mg/100g Phytic acid, 9.86mg/100g Tannin and 350mg/100g oxalate. Tamber had 27.39mg/100g Phytic acid, 9.57mg/100g Tannin, 220mg/100g Oxalate. Wheat had 22.63mg/100g Phytic acid, 8.29mg/100g Tannin and 210mg/100g Oxalate. Soyabean had 25.41mg/100g Phytic acid, 13.62mg/100g Tannin, and 770mg oxalate. Sesame had 29.77mg/100g Phytic acid, 11.76mg/100g Tannin and 465mg/100g oxalate, while Acha had 17.48mg/100g Phytic acid, 4.00mg/100g tannin and 140mg/100g oxalate respectfully. It was concluded that the research gave an information on the availability and the nutrient levels of the energy feedstuffs which can as well substitute for the conventional ones which are expensive, unavailable or seasonal in distribution. It was therefore recommended that, the research can serve as a guide to others in the field of animal nutrition who may wish to find out the proximate composition of other feedstuffs yet to be investigated for their nutrient levels.

**Key words: Proximate, composition, feedstuffs, energy, protein**

#### Introduction

In order to enhance livestock production, improve food security, and reduce the level of poverty in developing countries such as Nigeria, a search for cheape and locally available feedstuffs is required. Feed play a major role in livestock viability and profitability. Generally, it is agreed that feed cost accounts for between 60-85% of the total cost of livestock production. Livestock feeds particularly for non- ruminants are becoming prohibitively costly in the developing countries because of the increasing competition between man and livestock for food. One way of increasing animal protein production in the developing countries such as Nigeria is through use of the cheap and readily available feed ingredient in the diets of livestock. Although there are rooms for enhancing livestock production in Nigeria through improvements in the overall production system, in genetics and general farm management principles, the desired growth of livestock which is necessary in order to meet the increasing demand for protein is only



achievable through cost-effective and high quality feed (Gabriel *et al.*, 2007). Locally produced feed reduces the cost of production and hence, cheaper means of meeting the protein and energy requirements improve food security and reduce the level of poverty in developing countries, thus inexpensive and locally available feedstuffs are to be identified. The search for alternative protein and energy sources is to be focused on by-products and materials which are not suitable for direct human consumption (Hoffman *et al.*, 1997). However, in Nigeria a number of by-products from agricultural processing are available, which are usually not utilized for human consumption, but may have a high potential for small-scale farming. It is anticipated that the transformation of locally available by-products low in nutrients into high quality feed, can be a major contribution to improving the protein and energy supply for the local human population. Several agricultural and agro-industrial by-products available in Nigeria have been evaluated for their production potential in poultry and livestock feed (Ajebu 2010). However, only few data are available which cover the suitability of this resource. (Adamneh *et al.*, 2007; Ashagrie *et al.*, 2008). Development of a feed for production involves evaluation of proximate composition of feed components, digestibility and performance efficiency as well as cost implications and conditions of application. Grain legumes are important in human nutrition, where they contribute substantially to total protein intake. The proteins of grain legumes contain relatively more of the essential amino-acids lysine and tryptophan, and so usefully complement the amino-acids supplied by cereals in which the contents of lysine and tryptophan are relatively small.

### Materials and methods

The study was conducted in Bauchi, Bauchi State. Selection of the feedstuffs was done based on regional and temporal availability, and likely costs in the study area. Analyses were conducted at Rico Gadu Laboratory Miaya Belwa Local Government Area of Adamawa State. Feedstuffs of protein and energy sources which are important in diet formulation were targeted. Samples were collected during a period of two months (March to April 2021). Feedstuffs for the analysis of proximate composition were obtained from commercial markets across Jos, Bauchi and Adamawa States. The feedstuffs were first cleaned from any foreign materials, milled and screened to fine particle size (< 250 µm) and samples were analysed for proximate composition.

### Results and Discussion

**Table 1: Proximate Composition of Energy Feedstuff**

Feedstuff	DM	CP	EE	CF	ASH	NFE	ME
Cassava Meal	91.54	6.0	3.40	3.44	1.31	77.39	3208.77
Maize	91.49	7.42	3.43	2.73	1.11	76.80	3243.11
Sorghum	88.96	8.56	3.54	2.67	1.08	73.11	3165.14
Yam peel	85.75	6.92	2.24	3.03	1.24	72.33	2970.82
Rice	90.40	9.94	4.77	2.60	1.17	71.92	3275.17
Tamba	89.49	15.64	2.66	13.08	7.25	50.86	2576.37
Acha	87.78	8.23	2.55	-4.01	-2.87	83.88	3438.90
Pearl millet	92.00	10.8	2.30	4.10	7.20	67.60	2953.74
Tiger nut	85.00	8.51	17.00	13.1	1.20	45.19	3287.12
Wheat offal	89.62	15.50	3.15	8.02	4.45	58.50	2878.67

KEY:DM = Dry Matter, CP = Crude Protein, CF = Crude Fiber, EE = Esther Extract, ME = Metabolic Energy, NFE = Nitrogen Free Extract

**Table 2: Proximate composition of protein feedstuff (plant source)**

Feedstuff	DM	CP	EE	CF	ASH	NFE	ME
Palm kernel	97.42	14.41	7.33	20.96	8.77	45.93	2741.01
Groundnut cake	96.18	51.1	3.8	5.87	6.46	28.55	3215.59



Soya Bean meal	94.54	45.37	5.87	7.11	6.27	30.26	3190.14
Cotton seed cake	97.11	18.59	7.91	20.88	9.56	40.17	2740.82
Sesame seed	94.61	20.19	11.31	10.20	16.28	36.63	2954.24
Sunflower seed	94.36	21.92	8.84	6.11	6.06	48.43	3229.20
Cowpea seed	92.5	22.2	4.3	9.50	5.30	51.20	2965.14
Bambara nut	90.30	16.5	5.9	4.90	4.90	58.00	3126.82

KEY: DM = Dry Matter, CP = Crude Protein, CF = Crude Fiber, EE = Esther Extract, ME = Metabolic Energy, NFE = Nitrogen Free Extract

**Table3: Proximate Composition of Animal Protein feedstuffs**

Feedstuffs	DM	CP	EE	CF	ASH	NFE	ME
Fish meal	86.12	41.15	13.79	2.13	18.94	10.11	3004
Grasshopper	93.60	31.20	9.80	2.80	4.90	44.90	3527.54

KEY: DM = Dry Matter, CP = Crude Protein, CF = Crude Fiber, EE = Esther Extract, ME = Metabolic Energy, NFE = Nitrogen free extract

**Table 4: Anti-nutritional factors of some selected feedstuffs**

Feedstuff	Phytic Acid mg/100g	Tannins mg/100g	Oxalate mg/100g
Sunflower	23.82	9.86	350
Tamba	27.39	9.57	220
Wheat	22.63	8.29	210
Soya bean	25.41	13.62	770
Sesame	29.77	11.76	465
Acha	17.48	4.00	140

The proximate composition of these feedstuffs show some variation and this is due to crop species, variety, level of fertilizer application at growth phase, weather, damage at harvest as late harvest often lead to a decrease chemical composition, other factors that can affect the value of a feedstuffs include it's acceptability and utilization by animal, nutritional content, the handling and milling properties of the products (McDonald, 1988). Akande *et al.* (2010) reported that anti-nutritional factors are substances which either by themselves or through their metabolic products, interfere with feed utilization and negatively affect the health and production of animal. Many plant components and seeds of legumes and other plant sources contain in their raw state wide varieties of anti-nutrients which are potentially toxic (D'Mello, 2000). Therefore, exploitation of available conventional as well as unconventional feedstuffs in systematic way will increase productivity with minimum loss of ecological diversity (Ramchandrar *et al.*, 2019). A number of methods can be employed to reduce the toxic effects of these anti-nutrients in animal feeds (Yilka, 2015).

### Conclusion and Recommendations

The research gave some information on the availability and the nutrient levels of the energy and protein feedstuffs which can as well substitute for the conventional ones which are expensive, unavailable or seasonal in distribution. This work was therefore recommended to serve as a guide to others in the field of animal nutrition who may wish to find out the proximate composition of other feedstuffs yet to be investigated for their nutrient levels.



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