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## FOREWORD

Compliment of the season to all our contributors, well-wishers and world of Academia in general. I respectfully appreciate and welcome you all to the volume 3 issue 2 of Federal Polytechnic – Journal of Pure and Applied Sciences (FEPI-JOPAS) which is a peer reviewed multi-disciplinary accredited Journal of International repute. It is imperative to re-affirm that FEPI-JOPAS publishes full length research work, short communications, critical reviews and other review articles. In this issue, readers will find a series of manuscripts of top-rated significance in pure and applied sciences, engineering and built environment. This issue is the last of its kind for 2021 calendar year which features findings from basic and applied researches of high societal impacts from the seasoned authors. These articles have been reviewed and packaged for wider readership through the collective efforts of our managing editor, publishing editors, our valuable reviewers and editorial board members.

In this particular issue, you will find that Ilelaboye and Jesusina evaluated the quality of biscuits and chin-chin made from okara enriched plantain-sorghum flour blends. Ojo and Ebisin utilized convolutional neural network for gender classification through facial analysis. Omotayo and Fafioye investigated antimalarial potential of ethyl acetate fraction of *Phyllanthus niruri* while Olubodun and Adetona examined landscaping as a strategy for combating air pollution in Lagos megacity. Buoye and Ojuawo provided imperative dataset on Covid-19 crisis management in Nigeria and Brazil. Obun-Andy and Banjo investigated effective communication as a tool for good governance in Nigeria. Yusuff and co-workers conducted a field survey on fish hatcheries in Yewa South and Yewa North Local Government of Ogun State. Akinlade and co-workers meticulously expatiated on the effect of aqueous blend of three herbs on haemato-biochemical indices of broiler chicken at starter phase. Ajeigbe, Sangosina, Ogunseitan, Lawal, & Yusuff analysed the Effects of Neem Leaves (*Azadirachta Indica*) and Cassava Peels on the Performance of West African Dwarf Goat. Abdussalam & Adewole in their paper carefully explained the Formulation of Natural Products Repellents for the Control of Cockroaches (*Periplaneta americana*). Elesin & Obafunmiso gave as Assessment of Public Toilets Facilities Provision and Management in Tertiary Institutions in Nigeria- An Overview of The Federal Polytechnic, Ilaro, Ogun State.

I would like to deeply appreciate and extend my profound gratitude to my co-editors, editorial board members, reviewers, members of FEPI-JOPAS, especially the Managing Editor, as well as all the contributing authors for making the production and publishing of this volume 3 issue 2 a reality. I will like to appreciate the authors in this issue for allowing their works to be subjected to our thorough and rigorous peer-review processes and for taking all the constructive criticism in good fate. The authors are solely responsible for the information, date and authenticity of data provided in their articles submitted for publication in the Federal Polytechnic Ilaro – Journal of Pure and Applied Sciences (FEPI-JOPAS). I am looking forward to receiving your manuscripts for the subsequent publications.

You can visit our website (<https://fepi-jopas.federalpolyilaro.edu.ng>) for more information, or contact us via e-mail us at [fepi.jopas@federalpolyilaro.edu.ng](mailto:fepi.jopas@federalpolyilaro.edu.ng).

Thank you and best regards.

Prof. Olayinka O. AJANI

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## Effects of Neem Leaves (*Azadirachta Indica*) And Cassava Peels on the Performance of West African Dwarf Goat

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### Abstract

Ruminant animals like goats are one of the major animals reared by farmers in West Africa. This paper focus on West African dwarf (WAD) sixteen female goats weighing between the range of 5.33-5.37kg were used for the experiment lasted for 56 days, which examined the effects of Neem leaves (*Azadirachta indica*) and Cassava peel supplements (*Manihot Species*) on the performance of West African Dwarf Goats. The control diets which contained 100% Neem leaves and the other three diets in which Neem leaves were replaced with Cassava peels at 25%, 50% and 75% levels respectively which constituted four treatments. Allocation of four goats each into four treatments groups, in which each group were exposed to different experimental diets. The result obtained showed that the initial bodyweight and final body weight of the experimental animals were not affected by Neem leaves inclusion. Feed intake was significantly affected by Neem leaves intake. Weight loss was recorded for the animals in all the treatment and those on 100% level of Neem inclusion could not survive on Neem alone. The treatments shows that there are no significant difference in the conversion ratio of the feed intake. The digestibility of dry matter was lower in treatment II while it was high in treatment IV and Nitrogen utilization was lower in treatment IV and treatment III has the highest Nitrogen retained value. Hence it is recommended at below 25% levels. In conclusion, WAD Goats can not survive on Neem leaves alone since the Neem leaves given to feed WAD Goats alone resulted into weight loss.

**KEYWORDS**- world population, ruminant animal, nutrient, Cassavas peels, Neem leaves.

### INTRODUCTION

An increase in the world population today demands or calls for more protein supply by the farmers and this can be partly achieved by increasing the production of livestock to meet the challenges. Adequate diet is the principal nutritional key to achieving socio-economic advances and health improvement. An average Nigerian obtains about 9.5g of animal protein, and fat below 35g recommended by The World Health Organization as reported by Oyenuga. (1999) Improved feeding of ruminant animal is important particularly when there is shortage of water in the dry season and the quality of pasture is always low Leng,. (1990). The viability of an animal in the long- term of production highly rely on the animals quality and environmental factors and majorly their diet because this can reduce their quality, quantity and distribution in a year. Nsahali *et al* (2004)

The low nutrient of tropical grasses and their seasonal variability is the main limitation affecting the performance of ruminant animals. This consequently results is their low productivity. Grasses become dry, lignified and fibrous during the dry season, when the nitrogen content of feed is less than one percent, the

ruminant appetite will be depress and voluntarily intake of feed is reduced Nsahali *et al* (2004) .

Ruminants dies in most of the developing countries are unbalanced and inadequate protein, protein, minerals and vitamin. Adequate supplement of mixed concentrate, grains or protein foliage demonstrated improvement of rumen ecology, dry matter intake, quality and quantity of meat of the animals. Goat serve as insurance against crop failure because they can be quickly converted to cash in time of financial need .Osakwe (2004) . According to Ologun,(2004) goats play a vital role in the county's economy which serve as a source of protein intake.

In ruminant feed, cassava peel as a source of energy play a role as basal diet or s upplement. The presence of hydrocyanic acid makes fresh cassava peel difficult to feed the animals, dry, ensiling and fermented cassava peel are used to reduce the concentration level of the acid when feeding the animals which make it save to the animals. In view of this, this paper look at feed utilization by West African Dwarf Goats fed with Neem leaves and Cassava peels, assess the digestibility of Neem leaves and Cassava peels fed to West African Dwarf Goats and make recommendation base on the result obtained.



Neem (*Azadirachta indica*) is from mahogany family *Mediaceae* is a species in the genus *Azadirachta* and is indigenous to Bangladesh, India, Pakistan and it grows in tropical and subtropical regions.

In Nigeria, Neem is called Dongoyaro, Aryan Vappu in Malayalam and India, like Bevy in Canada. Also called Mwarobaini in Kiswahili which means the tree of 40s. Neem can treated about 40 different diseases.

## MATERIALS AND METHODS

The experiment was carried out at the Small Ruminant Experimental Unit of the Teaching and Research farm, Federal University of Agriculture, Abeokuta (FUNAAB) Ogun State, Nigeria.

The location which is 76m above sea level. Falls within latitudes  $7^{\circ} 5.5-7^{\circ} 8.0N$  and longitudes  $3^{\circ} 11.2-3^{\circ} 12.5 E$ . the climate is humid and is located in the derived savannah zone of South western Nigeria. It receives a mean annual precipitation of 1,037 and mean annual relative humidity of 82%.

### Experimental Animal and Management

Twelve (12) female West African Dwarf goats were used for the experiment they were allowed an

adaptation period of four (4) weeks during which they were dewormed, and treated against

Ecto-parasites with the use of Kepromec which was injected and they were vaccinated against Pests Petites Ruminant (PPR). Goats were maintained on Guinea grass and peels during the adaptation period, and later Guinea grass was gradually withdrawn.

After the adaptation period, animals were randomly distributed into four (4) experimental treatments in a group of three animals each. Animals were balanced for weight during the grouping period. Each group of animals was randomly weighted during the grouping period. Each group of animals was randomly assigned to one of the different experimental diets. Animals were housed and the experiment last for a period of eight weeks (i.e.56 days)

### Experimental Diets

Two experimental diets were fed to the animals. Neem leaves and Cassava peels which served as supplement. Cassava peels were bought and sun dried for 3 days and Neem leaves were harvested within and outside the University community which were wilted over night before feeding.

Table 1. Composition of Experimental Diet

Composition of Experimental Diet	
Treatments	Diet
I	100 Neem
II	75% Neem leaves + 25% Cassava peels
III	50% Neem leaves + Cassava peels
IV	25% Neem leaves + Cassava peels

## DATA COLLECTION

### Weight Changes

Animals were weighed, before the commencement of the Experiments and subsequently on a weekly basis, to monitor the growth pattern of the animals in response to the experimental diets. Animals were weighed prior to feeding on a weekly based to determine the weight changes. Experimental diets were offered by 8:00am daily.

### Feed Intake

Feed left over were weighed the following morning to estimate the feed intake .

### Feed Conversion Ration

Feed conversion ration was calculated by using feed intake and weight gain daily.

### Sample Analyses

Samples of Neem leaves and Cassava peels were collected for analyses of their Nutrient composition. After the feeding trial, the animals were transferred into metabolic crate for a period of 21days. The first 7 days serve as adaptation period while the last 14 days serve as data collection period. During this period estimation of feed intake, fecal and urinary outputs were made. Sample of the feed and faces collected were used for their digestibility test, by the method of A.O.A.C (1995). A.O.A.C (1995) method was used to analyze the Nitrogen content of the urine collected from the goats. Data obtained were used for digestibility and Nitrogen balance studies.

### Data Analyses

All data generated were subjected to analysis of variance (ANOVA) using completely Randomized Design and level of significant was taken at 5% probability. Significant means were separated using Duncan Multiple Range Test (Duncan (1995)).

## RESULT AND DISCUSSION

### Proximate composition of Experimental Diets Fed to the WAD Goats

The proximate composition of Neem and cassava peels were presented in Table 2 , the crude protein content of the neem leaves (22.32%) used in the present study was higher than 20.68% reported by Essonu *et al* (2006). The differences in the crude protein content may be due to age of the plant or the stage of maturity of the trees or the environmental factors. However the crude protein content of the cassava peels used in this study (5.26%)this is in line with the recommended range of (4.2-6.5%) reported by .Oyenuga.V.A (1999) and Nwukka (1997). Other researches reported 5.29% for crude protein in cassava peels Sonaiya (1993). The crude fibre content of neem leaves 4.87% was lower than 16.6% reported by Essonu *et al* (2006) . While the Ash and ether Extract content of the cassava peels were similar to that reported by Sonaiya (1993).

**Table 2: Proximate Composition of Experimental Diets (%)**

Parameters	Neem leaves	Cassava peels
Dry Malter	88.53	88.90
Crude Protein	22.32	5.26
Crude Fibre	4.48	9.85
Ash	4/.45	6.15
Ether extract	2.00	0.78
Nitrogen Free Extract	66.36	77.96
Neutral Detergent Fibre	41.50	49.89
Hemi cellulose	1.46	4.34
Acid Detergent Fibre	40.04	45.55
Cellulose	29.7	21.23
Acid Detergent Lignin	10.26	24.32

**Table 3. Shows the performance of WAD goats fed diets containing Neem leaves and cassava peels.** The initial body weight and final weight of the experimental animals were not significant affected by the levels of Neem leaves. The trend observed was that animals fed 75%Neem leaves had the lowest weight lost, followed by

25% and 50% Neem leaves were statistically (P>0.05) similar. However, animals in 25% Neem leaves recorded significant differences in all the treatments.

The weight loss was recorded for animal in all the treatments. These on 100% Neem inclusion could not

survive on Neem alone: they died at the fourth weeks of the experiment, this is in line with Nsahali *et al* (2004) which says the production of long term viability of any animal production largely depend on the quality of the of the animal and environmental factors with the their diet because feed can limit productivity in terms of quality, , quantity and distributon within the year.

The result for the body weight gain across the treatment group resulted from higher dietary inclusion levels which lead to decrease in weight gain. This could probably due to the effect of incomplete elimination of toxic factor this is in line with Esonu *et al* (2006) and Fassae (2005), in which they reported the effect of nutrient imbalance and poor metabolism on monogastric fed high level of Neem leaf meal and unconventional feed ingredients.

**Table 3: Performance of Experimental Goats Fed Diets Containing Neem leaves and Cassava peel.**

Parameters	100	75	50	25
Initial weight (kg)	5.33	5.33	5.37	5.33
Final weight (kg)		4.95	4.33	4.87
Daily weight gain/loss (kg)		-0.38	-1.04	-0.46
Feed intake		290.94 <sup>a</sup>	322.95 <sup>a</sup>	222.05 <sup>ab</sup>
Feed conversion ratio		-0.77	-0.21	-0.48
% Mortality	100	66.7	66.7	0.00

**Table 4, Shows the Nutrients digestibility by WAD goats fed the experimental diets.**

The digestibility of the Dry Matter ranged between 73.49-78.33, the Crude protein 67.68-70.58. Crude Fibre 82.45-87.03 and Ash 88.62-90.53 while the Ether Extract is 68.81-70.58, the Nitrogen Free Extract ranged between 72.82-77.78, Neutral Detergent Fibre 78.33-82.72, Hemi Cellulose 86.33-93.38 while that of Acid Detergent Fibre is 75.86-81.95 and Cellulose 75.30-82.86, the Acid detergent lignin ranges from 63.14-80.59.

The digestibility of Dry Matter was lower in treatment II while it was high in treatment IV. The higher Dry

Matter digestibility recorded in treatment IV shows that the animal has ability to digest the diets, this may be due to lower of Neem inclusion.

The Crude Protein digestibility was lower in treatment II and higher in treatment IV, animal fed containing 25% Neem inclusion has highest Crude Fibre digestibility value compared to those fed other diets. This could probably due to lower Dry Matter intake of animal, which could result in longer exposure of time, of feed to rumen fermentation

**Table 4: Nutrient Digestibility by WAD Goats Fed the Experimental diets (g/100gdm)**

NUTRIENT	Diets			
	Ti	T ii	T iii	T iv
Dry Matter	-	73.49	77.60	78.33
Crude Protein	-	67.68	70.58	69.01
Crude Fibre	-	82.45	87.03	88.40
Ash	-	88.62	89.33	90.53
Ether Extract	-	68.81	69.79	77.13
Nitrogen Free Extract	-	72.82	74.13	77.13
Neutral Detergent Fibre	-	78.33	82.62	82.72
Hemicellulose	-	86.33	92.35	93.38
Acid Detergent Fibre	-	75.86	81.95	81.90
Cellulose	-	75.30	82.86	79.23
Acid Detergent Lignin	-	77.70	80.59	63.14

**Table 5: Shows the nutrient utilization by experimental animals fed diets containing neem leaves and cassava peels.**

The result obtained shows that treatments II and III had highest nitrogen retained values. The nitrogen retained was lower in treatment IV.

**Table 5: Nitrogen Utilization by WAD Goats Fed the Experimental diet.**

Parameters	T I	T II	T III	T IV
Feed intake (DM)	-	257.90	286.75	197.15
Nitrogen in fed (%)	-	7.06	40.33	3.31
Faecal output (DM)	-	67.94	2.81	42.72
Nitrogen in faeces (%)	-	3.33	20.71	2.41
Urinary output (mls)	-	102.71	0.365	59.29
Nitrogen in urine (%)	-	0.596	13.59	0.601
Nitrogen intake	-	18.21	1.13	6.53
Faecal Nitrogen	-	2.26	0.08	1.03
Urinary Nitrogen	-	0.61	12.34	0.36
Nitrogen retained	-	15.34	19.10	5.14
Nitrogen retained (%)	-	84.24	91.10	78.71

### CONCLUSION

In conclusion, WAD Goats can not survive on Neem leaves alone since the Neem leaves given to feed WAD Goats alone resulted into weight loss.

It is recommended that Neem inclusion in the West Africa Dwarf Goat feed should be below 25% level since this research work shows that any inclusion above 25% will have negative impact on the animals,

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