



## Reproductive Performance and Milk Yield of West African Dwarf Goat Fed Diet Containing Fluted Pumpkin Vine Waste

Olatunji Oladotun Blessing\*, Fadairo Tolani, Oloruntoba Oluwapelumi Victoria, Olatunji Damilola Samuel, Olaleye Samson, Olasina Oluwatosin Sunday, Olatunbosun Yetunde Lateefat, Sanni Azeez Taiwo, Elias Adeniyi, Adewumi Olajumoke

Department of Animal Production and Health, Federal University of Agriculture, Abeokuta, Nigeria

\***Corresponding author:** Olatunji Oladotun Blessing, Department of Animal Production and Health, Federal University of Agriculture, Abeokuta, Nigeria. Tel: +2347065579527; Email: Olatunjioladotun1@gmail.com

**Citation:** Olatunji OB, Tolani F, Victoria OO, Samuel OD, Samson O, et al. (2019) Reproductive Performance and Milk Yield of West African Dwarf Goat Fed Diet Containing Fluted Pumpkin Vine Waste. Food Nutr J 4: 200. DOI: 10.29011/2575-7091.100100

**Received Date:** 06 June, 2019; **Accepted Date:** 27 August, 2019; **Published Date:** 04 September, 2019

### Abstract

This study was conducted to evaluate the reproductive performance and milk yield of West African Dwarf does fed diet containing fluted pumpkin vine waste which preliminary investigation has showed that several tons of the wastes are produced daily in market places around the country but scarcely useful and therefore create nothing but environmental nuisance. A total of twelve West African Dwarf goat does between the age of 7 to 9 months of average body weight range between 9-13kg were used for the experiment. The fluted pumpkin waste was included at 0 and 10g/1kg feed. There was no significant ( $P > 0.05$ ) difference for all the parameter considered, except for birth weight of kids. In conclusion, fluted pumpkin vine waste in the diet fed to gestating West African Dwarf does did not have negative effect on the parameter studied and also suggests a possible improvement on the birth weight of kids and milk yield.

**Keywords:** Fluted Pumpkin Vine; Milk Yield; Reproductive Performance; West African Dwarf

### Introduction

Goat production plays a vital role in the livelihood of rural populations in the developing world as it is considered a form of food security and source of independent income for rural households and subsistent farmers [1]. These animals have great economic potential because of their high fertility and early maturity as well as their adaptability to humid environment [2]. However, the need for increased animal protein production in developing countries like Nigeria cannot be over emphasized. This is because the population of Nigeria is constantly on the increase; with over 140 million population size according to the most recent population census figure [3].

Despite the fact that about 85% of the small holder farmers in Nigeria keep goats [4], Many Nigerians still consume less than 10 g of animal protein daily, against the minimum of 28 g/caput/day for a balanced diet [5]. To achieve success in increasing available animal protein in Nigeria, deliberate effort must be made in selecting the breeding stock and animals with high reproductive efficiency as reproductive inefficiency has been recognized as the most costly and limiting constraint to animal production [6,7].

Milk is the sole source of nutrients for the new born mammal, thus, its survival and potential to reach maturity is directly dependent upon the success of its dams' lactation [8] However, West African Dwarf goat is a poor milker, evidence of its low milk production is well documented [9]. Inadequate nutrition has been identified as one of the major factors responsible for the poor performance of West African Dwarf goats [10].

Fluted pumpkin (*Telfairia occidentalis*) is an important vegetable supplement in the carbohydrate dominated staple food chain of West Africa, particularly Nigeria. Fluted pumpkin is a rich source of protein, oil, vitamins and minerals [11] and had been proposed to have some medicinal values [12]. The tender vines, leaves and seeds are consumed by humans, while the mature vines constitute an important fiber source in animal diet [13].

### Materials and Methods

The experiment was conducted at the goat unit, Directorate of University Farms (DUFARMS), Federal University of Agriculture Abeokuta, Ogun State, Nigeria. Twelve West African Dwarf goat does between the age of 7 to 9 months of average body weight range between 9-13kg were used for the experiment. The does were mated either by coming to heat naturally or by introduction of male to induce heat in them by male effect as described by [14]. This

was carried out by the introduction of bucks (Red Sokoto) using one Buck to seven does in the flocks of does and allowing them to have physical contact with the buck, withdrawing the buck after 5 hours and reintroduction after 5 days. Thereafter those on heat are identified by their exhibition of classical oestrus signs of red vulva, restlessness, swollen vulva and standing erect to be mated. Does standing to be mounted and mated upon reintroduction of buck confirmed oestrus. Although not all the does came on heat the same day but this method has helped in bringing about oestrus synchronization and relative uniformity in the period of kidding.

Fresh fluted pumpkin vine wastes were collected from nearby markets located within Abeokuta. They were air dried after which they were taken to feed mill and milled. Concentrate and forage were offered as the experimental diet. Concentrate feed was formulated for the animals with cassava peel, Palm kernel cake, wheat offal, bone meal, grower premix and salt were obtained and compounded at a reputable feed mill, at Camp, Abeokuta, Ogun State. Treatment one (control) diet was without test ingredient and treatment two diet contained fluted pumpkin vine wastes (99% of concentrate and 1% of fluted pumpkin vine waste). The animals were fed daily at 4% of their individual body weight. Water was made available at all time.

Data were collected on the reproductive performance which includes gestation length in does, litter size, birth weight, kid mortality, number of singles and milk yield. Gestation lengths, litter size, birth weight was estimated to highlight the reproductive performance of does. Litters size was determined by counting the number of kids per doe and their individual birth weights were measured using a sensitive scale. Also, Live Body Weights (LBW) of kids were recorded weekly throughout the earlier lactation period and survivability percentage at week five after parturition was also determined.

Collection of milk samples for milk yield commenced from Day 7 post-partum to allow the kids to establish a strong relationship with the dams. Samples were collected at weekly intervals from day 7 after parturition. The kids were separated from the dams

at 12 hours' intervals before the dams were thoroughly milked. Animals were hand milked thoroughly between the hours of 7.00 to 10.00 hours. After milking the dams were allowed to nurse their kids. Milk was measured with a measuring cylinder.

Ingredient(%)	Compositions
Cassava peel	30
Palm kernel cake	32
Wheat offal	34
Bone meal	3
Growers premix	0.5
Table Salt	0.5
Total	100

**Table 1:** Percentage composition of experimental diet.

Treatment one (control) diet was without test ingredient and treatment two diet contained fluted pumpkin vine wastes (99% of the experimental diet and 1% of fluted pumpkin vine waste).

### Data Analysis

All data collected were compared and subjected to T test using independent sample mean test according to the procedure of Statistical Package for Social Scientist [15].

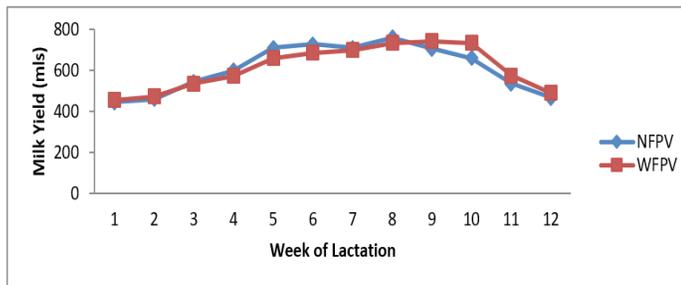
### Results

The effect of experimental diets on the reproductive performance of West African Dwarf does fed diet containing fluted pumpkin vine waste is presented in Table 1. Treatment effect on gestation length, litter size, birth weight of males and females and mortality of kids were not significant ( $p > 0.05$ ). The number of kids born in the diet containing the test ingredient (fluted pumpkin vine waste) was the same as the number of kids in the diet without test ingredient although significant difference ( $p < 0.05$ ) was observed in the birth weight of kid. Figure 1 below shows that milk yield recorded in the diet containing fluted pumpkin vine waste did not differ from the one recorded for the diet with no fluted pumpkin and consistent milk secretion was maintained throughout the period of milk collection except from a slight deviation that was observed at the 9th week of lactation thereafter, milk yield started to decline.

Parameters	0	10g/1kg	S.E.M 0	S.E.M 10/1Kg
Gestation length	146.00±1.08	144.80±1.46	1.463	0.927
Birth weight of kid (kg)	1.53 <sup>b</sup> ±0.05	1.31 <sup>a</sup> ±0.03	0.033	0.037
Litter size	1.00±1.00	1.00±0.00	0.000	0.000
Kid mortality	0.00±0.00	0.00±0.00	0.000	0.000
Birth weight of female (kg)	1.13±0.38	0.56±0.33	0.337	0.304
Birth weight of male (kg)	0.40±0.40	0.76±0.31	0.311	0.320

<sup>a,b</sup>: Means on the same row with different superscript are significantly ( $p < 0.05$ ) different.  
**T1:** 0% ingredient; **T2:** containing the test ingredient (1% ingredient).

**Table 1:** Reproductive performance of West African Dwarf does fed diet containing fluted pumpkin vine waste.



**Figure 1:** Milk yield of West African Dwarf goat fed with or without Fluted pumpkin vine NFPV: 0g/1kg Fluted pumpkin vine, WFPV: 10g/1kg Fluted pumpkin vine.

## Discussion

In this study, pregnancy was carried to term with similar gestation lengths which were comparable to the gestation length of 140-150 days reported elsewhere [16] although these were not significant between the treatments. Also, the litter size, kids' mortality, number of singles, birth weight of male as well as the birth weight of female had no significant difference.

Low dietary protein appeared to have imposed some constraints on birth weight during reproduction. The higher birth weight recorded seems to have resulted from higher dietary protein that is present the test ingredient (fluted pumpkin vine waste). It has been established that during mid-gestation in does, when placenta is developing, poor dietary protein can lead to reduced foetal weight [17,18]. This resulted into reduced birth weight and viability of kids [18].

All the kids survived and this might be as a result of higher birth weight that were recorded in this research. Generally, several factors which include poor hygiene, Peste des Petit Ruminants (PPR), Bronchopneumonia, theft and Predation [19,20] have been reported to be responsible for kids' mortality. Also, birth weights of the kids have a greater influence on the survivability and mortality of newly born kids [21]. Mortality rate increases, survivability decreases as the birth weight decreases [22].

Milk production increased from the first week of lactation and reaches its peak between 4<sup>th</sup> week and 8<sup>th</sup> week postpartum after which it declined until dried period set in. This result is similar to that [8,10] but this is in contrast to the result reported by [23] that stated that rise in milk yield in West African Dwarf Does would persist and attain peak within 3 to 4 weeks of lactation. Also, a slight increment was recorded at 9<sup>th</sup> week of lactation on the animals that were fed diet containing fluted pumpkin vine waste compare to animal fed diet with no fluted pumpkin vine waste and this improvement was consistent until after week 10 of lactation. This might be as a result improvement in the diet which might be resulting from the fluted pumpkin vine waste which is in line with

the findings of [24] that stated that within genetic limit, a slight improvement in dietary characteristics influence milk production.

## Conclusion and Application

- 1) This research revealed that Inclusion of fluted pumpkin vine waste in the diet fed to West African Dwarf does not have adverse effect on reproductive performance measured and milk yield. However, there were improvement observed for birth weight of the kids and milk yield.
- 2) The cost of production could be reduced with the inclusion of fluted pumpkin in the concentrate diet due to their availability.

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