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# Carcass quality of West African dwarf goats fed shea butter nut meal

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**Abstract**

*This study evaluated the carcass quality of West African (WAD) goats fed shea butter nut meal (SBNM). In the sixteen-week nutrition trial, twenty WAD goats aged 5 - 7 months were allotted to five treatments in a completely randomized design. Four concentrate diets were compounded with the inclusion of SBNM at 0, 25, 50 and 100% graded levels. The proximate components of SBNM and the experimental diets were determined. At the end of the feeding trial, two goats were randomly selected for slaughtering from each treatment to estimate the carcass quality. The proximate components of SBNM consist of 86.56% dry matter, 12.47% crude protein, 1.01%% crude fibre, 28.95%, 0.09% ash and 55.96% nitrogen free extract. The DM content of all the experimental diets was relatively similar in this study. The CP value of 100%SBNM was highest followed by 0%SBNM, 25%SBNM and 50%SBNM. The CF of 25%SBNM diet was higher than the other diets while the EE values were similar across all the diets. There were no significant differences among the mean of the carcass qualities of WAD goats. It could be concluded from this study that inclusion of SBNM in the diet of WAD had no deleterious effect on carcass qualities.*

**Keywords:** evaluation, carcass, WAD goats, shea butter

## Introduction

Goats constitute a very important part of the livelihood of livestock farmers in Nigeria (Okoruwa *et al*., 2013a). They also offer the cheapest source of domestically provides meat in the tropics because of their fecundity and low feed requirement when compare to cattle (Tsado *et al*., 2009). The potential of goat production in alleviating the problem of low animal protein intake by man in developing nations like Nigeria has long been noted by some workers (Adeokun *et al*., 2008). Despite the world-wide importance of goats as provider of essential meat and dairy products (Stella *et al*., 2007), low animal protein intake still remains one of the major human nutritional problem in Nigeria especially for the low-income earners. However, inadequate nutrition is one of the major factors contributing to the insufficiency in goat production. Numerous researchers' data indicated that low productivity of goats in Nigeria (Okoruwa *et al*., 2013a) is associated with problems of meeting their nutritional requirements. This is aggravated by seasonal fluctuation that affects the nutritive quality of forages most especially during the dry season and the steady increase in prices of feed ingredients due to competition between man and livestock. Thus, the use of agro-industrial by-products has been identified to contribute a vital role in the nutrition of ruminant livestock and ensure all year-round availability of feeds for animals. Shea tree which bears shea nut grows naturally in the wild in dry savannah belt of West Africa (FAO, 2014). The she-nut cake/meal have shown that it contains substantial nutrients (Agbo and Prah, 2014). Despite the nutritional potential of shea butter nut, limited literatures are available on its utilization for WAD goats.

Therefore, this study evaluates the carcass characteristics of WAD goats fed SBNM.

## Materials and methods

Twenty West African Dwarf (WAD) goats (6–7 weeks old) of both sexes were used in this experiment. They were randomly allotted to four treatments in a Completely Randomized Design. The goats in each treatment (five goats) were housed together in a slated floor pens at the Sheep and Goat Unit, The Oke Ogun Polytechnic Saki. Shea butter fruits were harvested, de-fruited, boiled and sun dried, de-husked, sundried, ground, packaged in polythene bag and stored in a cool dry place for subsequent use. Four concentrate diets were compounded by inclusion of shea butter nut meal (SBNM) at 0, 25, 50 and 100% levels (Table 1) which were fed to WAD goats at 3% of their body weight. The proximate composition of SBNM and the experimental diets were done according to AOAC (2000). Two goats per treatment were slaughtered by severing both the jugular veins and carotid arteries at the atlanto-occipital arhuculation (Okah, 2006). Data obtained was subjected to analysis of variance procedure of General Linear Model and the Duncan's New Multiple Range Test option of SAS (2008) was used for mean separation.

**Table 1: Gross composition of the experimental diets fed to WAD goats**

| Ingredients | 0%SBNM | 25%SBNM | 50%SBNM | 100%SBNM |
|---|---|---|---|---|
| Corn bran | 40.000 | 30.00 | 20.00 | - |
| SBNM | - | 10.00 | 20.00 | 40.00 |
| GNC | 20.00 | 20.00 | 20.00 | 20.00 |
| PKC | 37.00 | 37.00 | 37.00 | 37.00 |
| Bone meal | 2.00 | 2.00 | 2.00 | 2.00 |
| Premix | 0.50 | 0.50 | 0.50 | 0.50 |
| Salt | 0.50 | 0.50 | 0.50 | 0.50 |

## Results and discussion

The proximate composition of SBNM and the experimental diets is shown in Table 2. The SBNM consist of 86.56% DM, 12.47% CP, 1.01%% CF, 28.95%, 0.09% ash and 55.96% NFE. The 100%SBNM diet had highest CP (22.00) compared to 0%SBNM (19.40), 25%SBNM (18.80) and 50%SBNM (17.170). The EE and Ash contents are relatively similar across all SBNM graded levels. Diets containing SBNM were higher in NFE content than the 0%SBNM diet. The CP content of SBNM here was lower than 13.59% by Agbo and Prah (2014). Notably, the ether extract content of SBNM in this study was higher than 24.32% revealed by Agbo and Prah (2014). The DM content of all the experimental diets was relatively similar in this study. The CP value of 100%SBNM was highest followed by 0%SBNM, 25%SBNM and 50%SBNM. The CF of 25%SBNM diet was higher than the other diets while the EE values were similar across all the diets. There were no significant differences ($p>0.05$) among the means of the carcass parameters across the experimental treatments Crude protein content of the experimental diets fell within the crude protein requirement of 15-18% for growing lambs as reported by ARC (1990).

Although the CP content of all the experimental diets met the minimum 8% CP requirement by WAD goats (Norton, 2003), SBNM might not qualify as protein source in a formulated feed. There were no significant differences among the mean of the carcass qualities of WAD goats (Table 3). The dressing percentage in this study was lower than 40.56 – 43.28% reported by Odomelam *et al.* (2014) but fell within the range of 35 – 40% reported for WAD goats (Attah *et al*., 2004). The loin was lower than

values revealed by Ukpabi (2007). The feet and skin values in this study was lower than the values reported by Odomelam *et al.* (2014) for WAD goats fed diets containing bambara nut. The neck value was also lower than 6.31 – 6.77% revealed by Jalal *et al.* (2014). The values of kidney and liver in this study were lower than 1.09 – 1.26 and 2.92 – 5.29 reported respectively for WAD goats fed bread waste and *Moringa oleifera* based diets (Ayandiran *et al*., 2019).

**Table 2: Proximate composition of SBNM and the experimental diets**

| Parameters | SBNM | 0%SBNM | 25%SBNM | 50%SBNM | 100%SBNM |
|---|---|---|---|---|---|
| Dry matter | 86.56 | 89.02 | 89.39 | 88.85 | 89.11 |
| Crude protein | 12.47 | 19.40 | 18.80 | 17.70 | 22.00 |
| Crude fibre | 1.01 | 6.50 | 7.10 | 6.90 | 5.50 |
| Ether extract | 28.95 | 7.40 | 7.12 | 7.10 | 8.60 |
| Ash | 0.09 | 5.10 | 5.40 | 4.50 | 4.70 |
| NFE | 55.96 | 40.80 | 50.97 | 52.65 | 51.69 |

**Table 3: Carcass quality of WAD goats fed SBNM**

| Parameters | 0%SBNM | 25%SBNM | 50%SBNM | 100%SBNM | P value |
|---|---|---|---|---|---|
| Dressing % | 40.06 | 34.78 | 38.78 | 40.55 | 0.86 |
| Slaughter weight | 8600 | 6775 | 8450 | 7750 | 0.80 |
| Hot carcass % | 40.62 | 34.78 | 38.74 | 46.55 | 0.86 |
| Head % | 9.02 | 8.89 | 8.36 | 8.54 | 0.93 |
| Neck % | 3.81 | 3.71 | 4.06 | 4.66 | 0.63 |
| Feet % | 4.05 | 4.11 | 3.88 | 4.16 | 0.69 |
| Skin % | 7.38 | 7.11 | 8.02 | 8.34 | 0.96 |
| Forelimb % | 8.86 | 7.76 | 8.98 | 7.09 | 0.37 |
| Hind limb % | 8.86 | 8.50 | 9.32 | 6.70 | 0.15 |
| Loin % | 8.07 | 7.41 | 8.03 | 11.07 | 0.82 |
| Thorax % | 10.41 | 9.64 | 10.53 | 12.83 | 0.84 |
| Heart % | 0.54 | 0.60 | 0.63 | 0.70 | 0.82 |
| Kidney % | 0.49 | 0.50 | 0.49 | 0.44 | 0.92 |
| Liver % | 2.07 | 2.19 | 1.98 | 2.42 | 0.95 |
| Lungs % | 0.42 | 1.31 | 1.33 | 1.52 | 0.96 |
| Spleen % | 0.21 | 0.17 | 0.28 | 0.19 | 0.76 |

## Conclusion

The study showed that inclusion of shea butter nut meal in the diet of WAD had no deleterious effect on carcass quality.

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