PROXIMATE COMPOSITION OF FRESH GREEN OFFAL SOURCED FROM DIFFERENT RED MEAT ANIMALS

***Amos, M.[1], Mailili, T.Y.[1] and Ijasini, J.[2]**

[1]Department of Agricultural Technology, Federal College of Agriculture, Ishiagu, Ebonyi state
[2]Department of Animal Health and Production Technology, Federal College of Agriculture, Ishiagu, Ebonyi state

*Correspondence: gwaryshaels@gmail.com, 0806 441 7578

Abstract
The study evaluated the proximate composition of fresh green offal sourced from different red meat animals to determine their nutritional potential and suitability for feed or value-added applications. The experiment was conducted at the Animal Products and Processing Laboratory, Department of Animal Science, Ahmadu Bello University, Zaria, Kaduna State. Samples (1 kg each) of green offal (intestine and rumen) were collected from cattle, sheep, goat, and camel at the Central Abattoir, Kano. The samples were properly cleaned and analyzed for proximate composition following standard AOAC (2010) procedures. Results revealed that dry matter and lipid contents differed significantly ($P < 0.05$) across species, while crude protein, ash, and nitrogen-free extract (NFE) showed no significant differences ($P > 0.05$). Goat offal had the highest dry matter (47.53%) and lipid (16.28%) contents, whereas sheep recorded the lowest lipid value (9.88%). Crude protein ranged from 21.37% (sheep) to 22.61% (cattle), and NFE from 2.50% (goat) to 5.57% (sheep). These findings indicate that green offal from all red meat animals studied contains appreciable nutrients, with goat and cattle offal showing superior dry matter and protein values, making them suitable as potential feed resources or for agro-industrial utilization.

Keywords: Green offal, proximate composition, red meat animals, nutrient content, by-products.

Description of Problem

Green offal represents a significant by-product of red meat animals. Despite its abundance, it is often underutilized or improperly discarded, leading to nutrient wastage and environmental pollution [1]. Fresh green offal, however, possesses considerable potential as a low-cost and sustainable source of animal protein due to its rich nutritional composition, which includes appreciable amounts of crude protein, lipids, minerals, and residual carbohydrates. The proximate composition of green offal is influenced by several factors such as animal species, diet, age, physiological condition, and the specific part of the gastrointestinal tract from which it is sourced [2]. Understanding these variations is crucial for determining its nutritional value and possible utilization. Therefore, this study was designed to evaluate the proximate composition of fresh green offal sourced from various red meat animals.

Methodology

The study was conducted at the Animal Products and Processing Laboratory of the Department of Animal Science, Ahmadu Bello University, Zaria, Kaduna State. Zaria is located in the Northern Guinea Savannah Zone on longitude 11° 09' 01.78''N and 7°39'14.79''E at an altitude of 671m above sea level. The climate is characterized by well-defined dry and wet seasons [3]. Samples of 1kg each of green offal (intestine and rumen) from cattle, sheep, goat and camel were obtained from Central Abattoir, Kano. The collected samples were trimmed off connective tissues, fat, debris and dirt; then thoroughly washed. Each separate organ was washed with 150 - 200ml of clean and sterile water, ¼ teaspoonful of salt and 2-lemon (lime) were also added and used to wash each organ. The samples were subjected to proximate analysis at the Products Laboratory of the Institute for Agricultural Research, Ahmadu Bello University, Zaria using AOAC [4] procedures.

Results and Discussion

Chemical composition of fresh green offal sourced from different red meat animals

The chemical composition of fresh green offal from different sources of red meat animals is shown in Table 1. The results showed that there were no significant (P>0.05) differences in crude protein, ash and nitrogen free extract (NFE) contents while dry matter and lipid were significantly different (P<0.05) across the species. The dry matter content ranged from 43.44% (cattle offal) to 47.53% (goat offal), with goat offal having the highest value. The lipid content showed significant variation (P < 0.05) across species. Goat offal had the highest lipid content (16.28%), while sheep had the lowest (9.88%). Crude protein values ranged from 21.37% (sheep) to 22.61% (cattle) though not statistically different (P>0.05). The NFE content though not different statistically, was highest in sheep offal (5.57%) and lowest in goat offal (2.50%).

The observed variations in dry matter could be attributed to species differences in digestive physiology and feed composition. According to Ermers *et al*. [5], species with more fibrous diets tend to have higher dry matter in their digestive organs. Higher lipid content in goat green offal aligns with findings from Razmaitė *et al*. [6], which reported that lipid content in offal varies with species and fat deposition patterns. Higher fat content in goat offal may be due to species-specific metabolic adaptations. The higher fat content in goat offal suggests that it could serve as an energy-rich food source [2]. The lipid content (9.88–16.28%) reported in this study who noted species-dependent fat deposition patterns [6].

Table 1: Chemical composition of unprocessed green offal sourced from different sources of red meat animals

Source of offal	Dry matter (%)	Crude protein (%)	Lipid (%)	Ash (%)	NFE (%)
Camel	45.23^{ab}	22.49	13.89^{b}	6.18	2.67
Cattle	43.44^{b}	22.61	10.84^{c}	6.34	3.66
Goat	47.53^{a}	22.21	16.28^{a}	6.55	2.50
Sheep	45.03^{ab}	21.37	9.88^{c}	8.17	5.57
SEM	1.43	1.02	1.17	1.57	1.77
LOS	*	NS	*	NS	NS

^{abc}Means with different superscripts along the same column are significantly (P<0.05) different, SEM: standard error of means, NS: Not significant, NFE: Nitrogen-free extract.

Conclusion and Application

Goat offal showed the highest dry matter and lipid levels, while cattle offal had slightly higher crude protein content. However, the absence of significant variation in protein, ash, and NFE suggests that green offal from all red meat species can serve similar nutritional roles.

References

[1] Bester, M., Schönfeldt, H. C., Pretorius, B., and Hall, N. (2018). The nutrient content of selected South African lamb and mutton organ meats (offal). *Food Chemistry, 238,* 3–8.

[2]. Latoch, A., Stasiak, D. M., & Siczek, P. (2024). Edible Offal as a Valuable Source of Nutrients in the Diet-A Review. *Nutrients*, *16*(11), 1609. https://doi.org/10.3390/nu16111609.

[3]. Institute for Agricultural Research Metrological Station, IARMS (2020): Metrological Data from IAR Metrological Station, Ahmadu Bello University, Samaru, Zaria, Nigeria.

[4]. AOAC, (2010). Official Method of Analysis, 15th Edition. Association of Analytical Chemists. Washington D.C.

[5]. Ermers, C., McGilchrist, N., Fenner, K., Wilson, B., & McGreevy, P. (2023). The Fibre Requirements of Horses and the Consequences and Causes of Failure to Meet Them. *Animals: an open access journal from MDPI*, *13*(8), 1414. https://doi.org/10.3390/ani13081414

[6]. Razmaitė, V., Pileckas, V., Šiukščius, A., & Juškienė, V. (2020). Fatty Acid Composition of Meat and Edible Offal from Free-Living Red Deer (*Cervus elaphus*). *Foods*, *9*(7), 923. https://doi.org/10.3390/foods9070923.