PROXIMATE COMPOSITION OF DIFFERENTLY PROCESSED NEEM LEAF MEAL (*Azadirachta indica*)

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ABSTRACT
The proximate composition of neem leaf meal subjected to different processing methods was analysed to determine their nutrient contents. Fresh leaves were divided in to two parts : one part was air-dried and milled (unsoaked neem leaf meal; UNLM), while the other part was soaked, air-dried, and milled (soaked neem leaf meal; SNLM). These were analysed for dry matter, crude protein, ether extract, crude fibre, ash and nitrogen free extract using standard analytical methods in triplicates. The results revealed that the proximate composition of Unsoaked Neem Leaf Meal (UNLM) and Soaked Neem Leaf Meal (SNLM) were as follows: dry matter (91.36 and 90.97%), crude protein (18.68 and 19.58%), crude fibre (15.36 and 15.02%), ether extract (3.51 and 3.63%), ash (9.24 and 8.97%) and nitrogen free extract (44.57 and 43.77%). It was therefore concluded that neem leaves have the potential to serve as feed supplement in livestock.

DESCRIPTION OF PROBLEM
Plants and plant extract are very effective in the treatment of diseases and can also serve as food. Some plants offer multiple advantages, including providing plant proteins which reduced cost of production, requiring less difficulty of processing, and serving as medicinal plant. In Nigeria, a good number of different herbs and plant parts ranging from leaf meals and extracts, seeds, fruits and tree backs have been used in research as an alternative to the conventional feedstuff, growth promoters and antibiotics (9).

The neem tree (*Azadirachta indica*) popularly known in Nigeria as Dogonyaro is a fast growing indigenous tropical tree that thrives well in all parts of Nigeria (7). Many studies have investigated neem leaves as a possible feed in poultry nutrition (12, 6). The neem tree has been widely researched and it has attracted world-wide recognition due to its vast range of medicinal potentials, such as antibacterial, antiviral, antifungal, antiprotozoal, hepatoprotective and anti-coccidial effect in broilers, as well as its use as pesticide (1). However, the use of neem leaves as animal feed is limited due to the presence of the bioactive compounds (azadirachtin, limonoids and tannin) that have deleterious effect on nutrient utilization (5). Additionally, the high fiber content in neem leaf meal poses serious intake and digestibility problems in poultry diets (11). Utilization of neem leaves as animal feed will require appropriate processing to reduce these anti-nutrients as well as the knowledge of the effects of the processing method on the nutrient composition such feed. Therefore, the objective of this study was to investigate the effect of soaking neem leaves in water on the proximate composition of the resultant meal.

MATERIALS AND METHODS
Experimental Site
The experiment was carried out in the Laboratory Unit of the Department of Animal Production and Health, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria.

Sample Preparation
Fresh neem leaves were harvested from middle-aged green trees around Faculty of Agricultural Sciences, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria. The harvested neem leaves were divided into two parts: A and B. Sample A was air-dried without any further processing while sample B was soaked in water for 3 days before air-dried. The leaves were ground into powder using a mortar and pestle to reduce particle size and preserved until analysed. Sample A was named unsoaked neem leaf meal (UNLM) while sample B was named soaked neem leaf meal (SNLM).

Laboratory Analysis of Neem leaf

Proximate analyses of the two samples were carried out at the laboratory to determined dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE) and ash using methods of Association of Official Analytical Chemist (1). Nitrogen free extract was determined by differences (100-CP+CF+EE+Ash).

RESULTS AND DISCUSSION

The result in Table 1 shows the proximate composition of processed neem leaf meal. The CP content in UNLM (19.58%) was higher than that of SNLM 18.68% but both are within the range of 18.90-24.06% reported by other researchers (8 and 10). The CP obtained in this study was higher than 15.8% reported by (3). The CF was found to be 15.02% in the unsoaked neem leaf and higher than 6.0% reported by (8). Soaking of leaves reduced crude protein because soluble nitrogenous compounds and small peptides are lost into the water (leaching) which is capable of increasing the relative weight of the CF and ash. The high level of CF in neem leaves also indicates that they will be very useful for maintaining internal digestion and normal peristaltic of the internal tract (2). The fibrous material increases the volume and bulk of digesta and stretching the gut wall. The CF content of UNLM (15.02%) and SNLM (15.36%) obtained in this study is very close to 14.6% reported by (3). Dietary fibre decreases cholesterol absorption from the gut, in addition to delaying the digestion and conversion of starch to simple sugars, an important factor in diabetes management. Dietary fibre also functions in protection against cardiovascular disease, colorectal cancer and obesity. The EE was slightly lower than the 6.0 and 8.5 % reported by (8) and (3), respectively. The ash content of UNLM (8.97%) and SNLM (9.24%) obtained in this study was higher than 4.5% reported by (4), (3) and (10). The ash content in neem leaves could be a source of inorganic elements when fed to livestock. The slight differences in the nutrient composition may be attributed to the differences in neem tree variety, leaf age, soil composition, environment, and processing method.

Table 1 proximate composition of unsoaked and soaked neen leaf meal

Parameters (%)	Unsoaked neem leaf (UNLM)	Soaked neem leaf (SNLM)
Dry matter	90.97	91.36
Crude protein	19.58	18.68
Crude fibre	15.02	15.36
Ether extract	3.63	3.51
Ash	8.97	9.24
Nitrogen free extract	43.77	44.57

CONCLUSION AND APPLICATION

Conclusively, the nutrient compositions reveal that neem leaves has potential of serving as supplement for feed for animals. However, UNLM had higher values of crude protein compared to SNLM while SNLM had slightly higher fibre content than UNLM.

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