PROXIMATE AND MINERAL COMPOSITION SCREENINGS OF *Clitoria ternatea* LEAVES AND SEEDS

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ABSTRACT

The leaves and seeds of *Clitoria ternatea* were evaluated for the proximate, mineral and anti-nutritional composition. Atomic absorption spectrometry were used in determination of the seeds and leaves for Phosphorus (P%), Potassium (K%), Magnesium (Mg%), and Calcium (Ca%) were also determined using appropriate technique. The result of proximate analysis indicate that leaves and seed have high crude protein (26.75% and 48.30%), dry matter (93.82% and 90.50%), Ash (6.90% and 7.50%), crude fiber for both leaves (11.70%) and seed (8.10%) while the ether extract for leave (5.31%) and seed (7.90%). Mineral analysis indicate the *Clitoris ternatea* leave and seeds contained some essential mineral such as %P (0.40%) leave and (0.35%) seeds, %K (1.13%, 0.78%), % Mg (0.30%, 0.26%) and %Ca (0.37%, 0.34%)for leave and seeds for *Clitoris ternatea*. The overall result suggested that *Clitoria ternatea* leaves and seed is of high nutritionally quality due to high protein and mineral contents.

Keywords: *Clitoris ternatea*. Proximate, Mineral Composition, leaves and seeds

Description of Problem

Livestock usually derive most of their dietary nutrient from plant materials. However, as a result of high temperature region in the tropics, it stimulates the growth and aging of the plants with a consequent fall in nutrients and digestibility. This changes in nutritional quality results in very irregular growth and marked fluctuation in seasonal weights gains of the animals (Smith *et al.,*1989). A large number of leguminous leaves and seeds are able to meet the nutrient requirements of small ruminants for production (Akinlade *et al.,*2004). The *Clitoria ternatea* is a high – quality protein-rich legume, a tropical "alfalfa" often referred to as a protein bank that can be grown at low cost (Cook *et al.,*2005). *Clitoria ternatea* is palatable and has high nutritive value, with a higher leaf nitrogen percentage and lower acid digestible fibre than most other tropical legumes. As a result of poor nutrition which is major constraint to livestock production, especially during the dry season when available feed quantity is low and quality extremely poor (Alhassan, 1987). There is need to mitigate the problem with the use of sown and purposely managed pastures. The shortage of feed for ruminants can be solved through cultivation of forage crops with better nutritional values than the existing feed resources. This can be achieved with the establishment of leguminous forage (Poppi and McLennan, 1995). Furthermore, to improve livestock productivity in Nigeria, sustainable solutions to essential deficiencies in feed availability and quality are required. A number of pasture legumes such as *Centrosema, Desmodium, Canavalia* and *Glycine* have been tried in Nigeria, but the minor information is on *C. ternatea* compared with those legumes mentioned above. The objective of the study was to assess the nutritional contents of *C. ternatea* leaves and seed.

Materials and Methods

Experimental Site

The experiment was conducted at Teaching and Research Farm of Oyo State College of Agriculture and Technology, Igboora in the derived Savannah zone of Nigeria. The College is located within $7^0$15'North and $3^0$30' East of the equator with an average annual rainfall of 1278mm and average annual temperature of 27^0C (Sanusi, 2011).

Collection of Plant Materials
The leaves and seeds of *Clitoria ternatea* were all obtained from pasture demonstrated unit, Teaching and Research Farm. The seeds were then separated from their shells, dried appropriately, milled with blender and stored in air-tight containers until required for analysis.

Proximate Analysis and Mineral Analysis
The leaves and seeds were analyzed for moisture content, ash, crude fat, crude protein and crude fiber were determined in accordance with the Standard Methods of the AOAC, (1990).
The minerals such as K, P, Mg, Ca, Fe and Zn were determined by the atomic absorption spectrophotometric method. Phosphorus was determined spectrophotometrically using the vendates solution (Sekine, *et al.* 1965).

Statistical Analysis
The data collected were subjected to Student T test of SAS package.

RESULTS AND DISCUSSIONS
Proximate composition
The proximate composition of both leaves and seed of *Clitoria ternatea* is shown in Table 1. The high dry matter content obtained on both seeds and leaves of *Clitoria ternatea*. The percentage ranged (90.50 – 93.82%), indicating high shelf – life of the leave and seed hence long storage would not lead to much spoilage due to its susceptibility to microbial attack especially of drying. The percentage Crude Protein of leaves (26.95%) and seeds (48.30%) were above 17.5% recorded for *Stylosanthes hamata* leaves (Akinlade, *et al*., 2007). The higher crude protein recorded for both seed and leaves of *Clitoria ternatea* in the present study above 7% CP requirement for ruminant animal which will provide ammonia requirement by the rumen microorganism to support optimum microbial activity. The Ash content value of *C. ternatea* leave (6.90%) and seed (7.50%) were observed to be higher than value (0.11%) reported for *Mucuna utilis* leaves by Ujowundu *et al*., (2010), The ash values for both seed and leaves obtained for the present study fell within the range of 3.0 – 9.65% (Okoli, *et al*., 2001). Ash content useful in assessing the quality grading of mineral element present in the *C. ternatea* leave and seeds. Ether extract content of *C. ternatea* seed (7.90%) and leaves (5.31%) which were higher than (1.89%) reported for *Canavalia ensiformis* leaves (Akinlade, *et al*., 2007). Also higher than the 1.9% Ether extract for lablab seed (Osman, 2007).The Crude Fiber content of *C. ternatea* leave (11.70%) and seeds (8.10%) were lower compared with (14.80%) of *Mucuna utilis* leaves reported by Ujowundu, *et al* (2010) and 23.80% for *Stylosanthes hamata* (Akinlade, 2004). Arukwe *et al,* (2012) reported that 3.10% obtained for *Persea ameneansn* seed but lower than 8.10% recorded for *C. ternatea* seed. The crude fiber content of both seed and leaves samples did not fall within the range of 15 – 20% recommended for improved intake and production in finishing ruminant (Buxton, 1996).

Table 1: Proximate contents of seed and leaves of *Clitoria ternatea*

Proximate (%)	Leaves (%)	Seeds (%)
Dry matter	93.82	90.50
Crude protein	26.95	48.30
Ash	6.90	7.50
Ether extract	5.31	7.90
Crude Fibre	11.70	8.10

Mineral composition
The mineral analysis of both leaves and seeds of *Clitoriaternatea* indicated their richness in Phosphorus, Potassium, Magnesium, Calcium and Iron in Table 2.The mineral analysis of a plant gives the idea of possibility either the plant should be used for any feeding trial purpose. The phosphorus content for leave (0.40%) and seed (0.35%) were higher compared to the NRC recommended value of 0.15% for Phosphorus (NRC. 1985). The level of Phosphorus in both the seed and the leaves of *C. ternatea* was consistently above the 0.2% level which would satisfy livestock

dietary maintenance requirement (NRC. 1985). The value of Potassium (%K) in both seed (0.78%) and leave (1.13%) were higher than (0.46%K) for *Canavalia ensiformis* leaves by (Akinlade, *et al.*, 2007) and for seed of *Brachystegia eurycoma* harms (0.25%) in the present investigation the level of %K in *C. ternatea* leaves was over 0.18% recommended for grazing animals (McDowell, 1985). Potassium help to maintain body weight and regulate water and electrolyte balance in the blood and tissue (NRC, 1985). Magnesium (Mg) content for leave (0.30%) and seeds (0.27%) both were higher than value 0.20% reported for *Canavalia ensiformis* leave by (Akinlade, *et al.*, 2007). The higher forage and seed Mg level found in this present study were above 0.12 – 0.20% of requirement of ruminants diet suggested by NRC, (1985).The Calcium (Ca) content of both seed (0.34%) and leave (0.27%) were higher than (0.09%) observed in *Canavalia ensiformis* leave by (Akinlade, *et al.*, 2007). The leaves and seed Ca values found in this study were considered adequate for the optimum performance of ruminants. The values of both leaves (0.37%) and seed (0.34%) of %Ca for *Clitoria ternatea* would meet the theoretical Ca requirement of 0.30% %Ca diet needed for all forms of production in ruminants (ARC, 1980).

Table 2: Mineral composition of seed and leaves of *Clitoria ternatea*

Mineral Content	Leaves	Seeds
Phosphorus (%)	0.40	0.35
Potassium (%)	1.13	0.78
Magnesium (%)	0.30	0.27
Calcium (%)	0.37	0.34

CONCLUSION AND RECOMMENDATION

It can be concluded from the results from this study that the *Clitoria ternatea* leaves and seed appeared to have the potential as feed supplements. Higher content of protein and minerals contents would make them good protein supplements to poor quality roughages especially during the dry season of the derived savannah zone of Nigeria.

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