

**NSAP****47th Annual
Conference
(JOS 2022)****CONFERENCE
PROCEEDINGS**THEME
**SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES****CRUDE PROTEIN CONTENT OF LABLAB (*Lablab purpureus* CV *rongai*) AS INFLUENCED BY HARVESTING PERIOD UNDER GREEN HOUSE CONDITION****¹Gaddafi, S., ²Hassan M.R., ¹Garba, M.G., ¹Jibia, Z.S., and ¹Murtala, U.**¹Department of Animal Science, Federal University Dutsin-ma, Nigeria,²Department of Animal Science, Ahmadu Bello University Zaria, Nigeria,*corresponding author: sanigaddafi4@gmail.com: GSM: +234(0)7067212353**ABSTRACT**

Green forage demand for the rapidly expanding livestock industry is increasing day by day, particularly in Nigeria. This study examined the effect of cutting lablab at different stages of growth on the crude protein content (CP). The experiment was set in a completely randomized design (CRD), with forty two (42) pots and six different harvesting date at weekly interval were considered as treatments for forage part (leaves, stem and roots) crude protein. Data obtained from this study were presented using Bar-charts. Bar-chart 1, 2 and 3 represent crude protein content of lablab leaves, stem and roots harvested from week 1 to 6 post germination. The result indicated that lablab leaves and stem harvested at week 6 had the highest crude protein content of 12.55% and 9.95% CP, respectively while roots harvested at week 5 had better crude protein content (5.45%CP). It was therefore suggested that lablab purpureus forage should be harvested at week 6 of age post germination for optimum crude protein content for livestock forage.

Keywords: Crude protein; Lablab purpureus.**INTRODUCTION**

Livestock production in Nigeria is adversely affected due to low quantity and poor quality of the available feed, particularly in the dry season. The natural grassland on which the national livestock industry depends on indigenous forage species is low in nutritional value and quality. Pasture can increase animal production immensely. In Nigeria and many other tropical countries low yield, poor quality and inefficient utilization of natural pasture are some of the factors limiting productivity (Sodeinde *et al.*, 2006). Lablab is fast growing legume that can provide fodder less than 3 months after sowing (ILRI, 2013). Green forage demand for the rapidly expanding livestock industry is increasing day by day, particularly in Nigeria and in most tropical countries. It provides nutritious forage for livestock for growth and development. Meanwhile, inadequate supplies of feeds continue to pose a bottle neck to livestock production in Nigeria (Okwori and Magani, 2010). Emphasis of forage legumes (like lablab) production that is high yielding in dry matter and nutritional quality will go a long way to cover the shortfalls of feed supply to livestock industry. Therefore, proper forage establishment, development of more grazing reserves, use of biotechnology, proper forage and fodder conservation and other management measures will be key step in having a profitable pasture in Nigeria (Gaddafi *et al.*, 2019). The objective of this study was to evaluate the effect of date of harvest on crude protein content of lablab produce under greenhouse condition.

MATERIAL AND METHODS***Experimental site***

The study was carried out in the glass house located in the Faculty of Agriculture, Ahmadu Bello University, Samaru, Zaria. The study area is located between latitude 11° 9' 45''N and 7° 38' 8''E longitude at an altitude of 610m above sea level within the Northern Guinea Savannah vegetation zone. The climate of the area is sub-humid; rainfall is well distributed during the rainy season, with a mean annual rainfall of 1100mm. the rainy season starts from late April to early mid-October and about 70% of the rain occurs during the months of July and August, followed by the harmattan period of cool and dry weather which usually last from October to February. This is then followed by hot-dry weather from March to April. The average ambient temperature and relative humidity during the wet season are 24.7°C and 72% respectively.



NSAP

47th Annual Conference
(JOS 2022)

CONFERENCE PROCEEDINGS

THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES

This is followed by the hot weather when temperatures fluctuate during day from 13 to 36°C with a mean relative humidity of 20 to 37% (IAR, 2016).

Sources and type of Lablab bean

Lablab purpureus variety (Rongai white) used in the experiment was obtained from the forage and crop residue programmed of the National Animal Production and Research Institution (NAPRI) Shika-Zaria.

Experimental design and management

Forty two (42) pots were used for the experiment. The lablab seeds were sown on 16th April, 2014. Water within Faculty of Agriculture Ahmadu Bello University Zaria was used for irrigation 0.22g of single super phosphate (SSP) was applied to 1 kg of soil in the pots at planting in two (2) split doses. Samplings were done at weekly intervals, at every harvest, pots were sorted out, lablab plants were carefully removed from the pots and soil was washed from the roots, after that the plants were separated into leaves, stems and roots and each was put into a labeled envelop and taken to the Biochemical Laboratory for oven drying. Harvesting parts (Leaves, stem and roots) was considered as treatment and replicated six times in a completely randomized design (CRD).

Crude protein determination

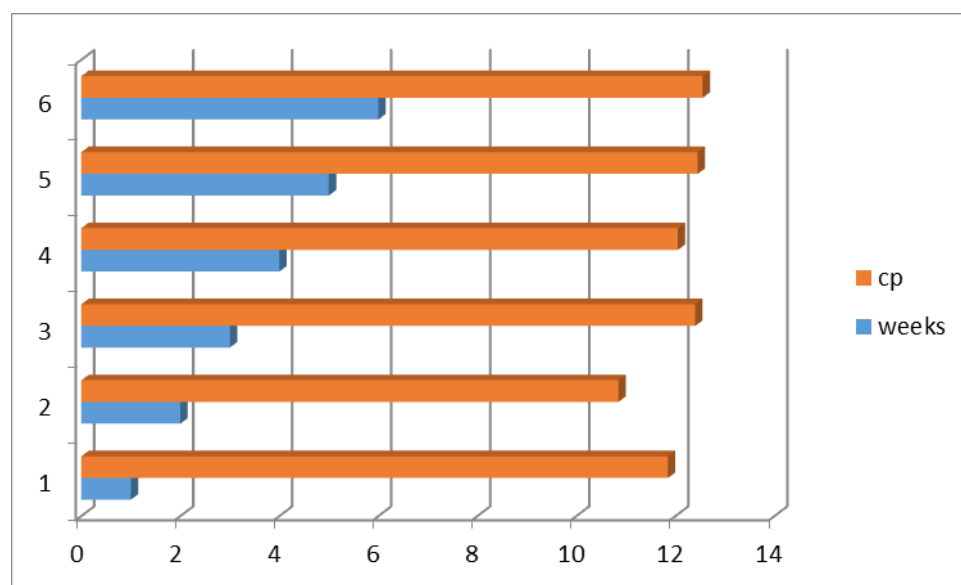
The methods used for crude protein determination was Kjeldahl distillation method, the samples were ground and 0.5g was added into 25mls of concentrated sulphuric acid and the color was turned to black. The above was taken into a digestion block and was heated, a clear solution was then formed (golden yellow). The sample then was brought and allowed to cool, when it was still a little warm, distilled water was added to avoid forming a block. It was later poured into 100mls volumetric flask and cover. The solution was poured into sample bottles into a Kjeldahl distillation apparatus. Ten (10) mls of sample were mix into 10mls of sodium hydroxide. The gas-nitrogen was condensed and changed the sample from purple to green colour. The reading was taken and the crude protein was calculated as $N \times 6.25\%$ (AOAC, 2006).

Statistical Analysis

Data obtained on crude protein content in this study were analyzed using descriptive statistics of percentages with SPSS Software and were presented in bar-charts.

RESULTS

The mean crude protein content (%) of lablab forage (leaves, stem and roots) cut at different harvesting period (week 1 to 6 post sowing) were presented in bar-chart 1 to 3. The result revealed that the mean CP content of leaves harvested at week 6 (42 days) after sowing (12.55% CP) was higher than that of week 5 (12.45% CP) followed by week 3, 4, 1 and 2 that is 12.40, 12.05, 11.85 and 10.85% CP, respectively .





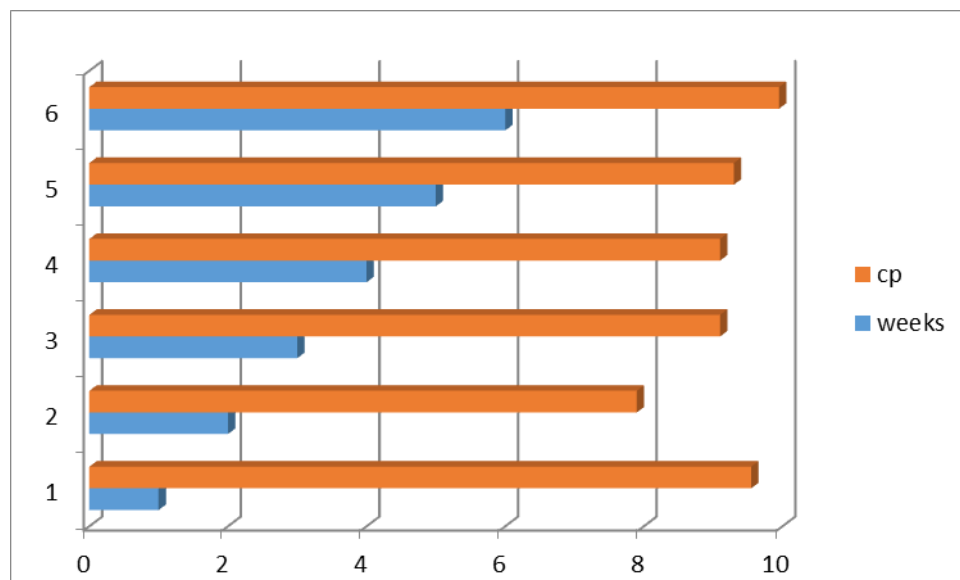
NSAP

47th Annual
Conference
(JOS 2022)

CONFERENCE PROCEEDINGS

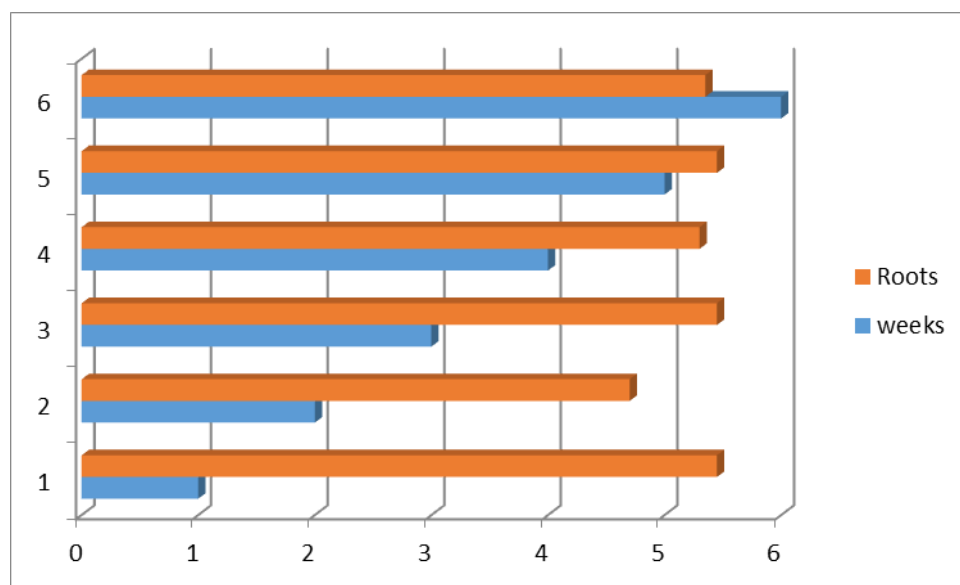
THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES

Bar-chart 1: Mean crude protein content of leaves harvested from week 1 - 6 post germination



Bar-chart 2: Mean crude protein content of stem harvested from week 1 – 6 post germination

The result indicated that stem harvested at week 6 (9.95% CP) had higher crude protein content this was followed by week 5 with 9.30% CP, mode values occurs in week 3 and 4 with similar crude protein content of 9.10% CP, respectively, while week 2 harvest (7.90% CP) had lower stem CP content among stem harvest .



Bar-chart 3: Mean crude protein content of roots harvested from week 1 – 6 post germination.

**NSAP****47th Annual
Conference
(JOS 2022)****CONFERENCE
PROCEEDINGS**THEME
**SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES**

The mean root crude protein content was higher at both week 1, 3 and 4 with a similar crude protein numerical values of 5.45% CP followed by week 6 (5.35%) and 2 (4.70%). There are inconsistent and un-linear trend of CP values of roots with increased harvesting period in this study.

DISCUSSION

The reported crude protein content of *lablab purpureus* leaves in this study were comparable to those reported by Milford and Milson (1968) who reported that the mean crude protein content of lablab leaves ranged from 10.50% to 38.50% on a dry matter basis. The crude protein content of *lablab purpureus* stem in this study were within the range of 7.00 to 8.00% and 7.20 to 18.00% CP reported by Cameron (1988) and Mayer *et al.* (1986). However, the crude protein content of *lablab purpureus* roots had the CP of 4.70 to 5.45% and 4.90 to 5.50%. The likely differences noticed in the crude protein composition of lablab leaves in this trail concurred with the reports of several authors in different forage legume Abdu, *et al.*, (2012), Adamu *et al.*, (2013), reported that environmental differences, variation in relation to stage of growth of the plants and types (twigs, leaves or soft stem) of foliage sample, site of sampling and/or proportion of foliage materials sampled and soil influence the chemical composition and digestibility of forage. From the result it would be observed that the date of harvest has great effect on crude protein content of leaves at week 6 (42 days), this result agreed with Milford and Minson (1968) who reported that, the protein content and digestibility of legumes decline with maturity. The significant changes in *lablab purpureus* roots crude protein in this study might be attributed to increase in nodulation, nitrogen fixation, rapid growth, protein synthesis, level of irrigation, soil pH, nutritional status of soil, temperature, sample storage or genetic specificity.

CONCLUSION

From the result of this study, for optimum crude protein (CP) content it is therefore suggested that *lablab purpureus* forage in greenhouse condition should be harvested at six (6) weeks of age post germination where maximum crude protein (12.55% CP) was obtained for livestock forage.

REFERENCES

- Abdu, S.B., Ehoche, O.W., Adamu, A.M., Bawa, G.S., Hassan, M.R., Yashim, S.M and Adamu, H.Y. (2012). Effect of varying levels of *Zizyphus mauritiana* leaf meal inclusion in concentrate diet. *Iranian Journal of Applied Animal Science*, 2(4): 253-256.
- Adamu, H.Y., Lamidi, O.S., Ehoche, O.W., Abdu, S.B., Hassan, M.R. and Yashim, S.M. (2013). Growth performance of Yankasa rams fed varying proportion of *Gmelina aborea* leaves. *Nigerian Journal of Animal Science*, 3: 145-157.
- AOAC (2006). Official Method of Analysis, 18th Ed. Association of Official Analytical Chemists, Washington DC, USA
- Cameroon, D.G. (1988). Tropical and subtropical pasture legumes. *Queensland Agriculture Journal*, 110-113.
- Gaddafi, S., Garba, M.G., Ajibola, O.O., Alkali, M.M. and Dabai, M.I. (2019). A photo-essay of pasture establishment at the Livestock Teaching and Research Farm, Federal University Dutsin-Ma, Katsina State. *Proceedings at the 3rd Biennial conference of the society for Grassland and Development in Nigeria* Held at the National Animal Production Research Institute, A.B.U-Shika, Zaria, 3rd-6th Nov., 2019, 44-49.
- IAR, (2016). Meteorological unit, weather report, Institute for Agricultural Research, Ahmadu Bello University Zaria.
- ILRI, (2013). Lablab (*Lablab purpureus* cultivar *Rongai*) for livestock feed on small-scale farms. International Livestock Research Institute forage factsheet. Nairobi, Kenya.
- Mayer, L., Chandler, D.R. and Taylor, M.S. (1986). *Lablab Purpureus*-A fodder crop for Botswana. *Bulletin of Agricultural Research in Botswana*, 5:37-48.
- Milford, R. and Minson, D.J. (1968). The effect of age of method of hay making on the digestibility and voluntary intake of the forage legumes *Dolichos lablab* and *Vigna sinensis*. *Australian Journal for Experimental Animal Husbandry*, 8:409-418.
- Okwori, A.I. and Magani, I.E. (2010). Influence of nitrogen sources and cutting interval on the digestibility of four (4) grass species in the southern guinea savanna of Nigeria. *Agriculture, Biological Science Journals America*, 1(4):526-533.
- SAS, (2002). Users guide: Statistical Analysis System Procedure. SAS institute, inc. Cary North



NSAP

47th Annual
Conference
(JOS 2022)

CONFERENCE PROCEEDINGS

THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES

Carolina, U.S.A.

Sodeinde, F.G., Akinlade, J.A., Aderinola, O.A. and Adesokan, A.T. (2006). The effect of poultry manure on proximate composition and *in vitro* gas production of *panicum maximum* CV.T58 in derived savanna zone of Nigeria. *Pakistan Journal of Nutrition*, 8:1262-1265.