CHARACTERISTICS AND PREFERENCE OF GRASS FORAGES ENSILED WITH LABLAB ON WEST AFRICAN DWARF GOATS

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Abstract
This study investigated the feeding values of silages of some grasses and their preference by West African Dwarf (WAD) goats. Four (4) grasses (*Brachiaria ruziziensis*, *Brachiaria* mulato II, *Panicum maximum* and *Chloris gayana* were used. Each grass was ensiled with *Lablab purpureus* in ratio 3:1 to make four (4) treatments (ML=Mulato+Lablab, CL= Chloris+Lablab, BL= Bracharia+Lablab and PL= Panicum+Lablab in a completely randomized design. The colour, pH and chemical compositions of silages were assessed 28 days after ensiling and were latter fed to WAD goats for their preference (COP). The Crude protein (CP, %) and Neutral Detergent Fibre (NDF, %) of silages were determined using standard procedures. All the grasses produced silages with olive green colour and pH ranging from 4.26 to 4.55. The CP of silages ranged from 10.06±0.44 in Chloris+Lablab to 12.17±0.31 in Bracharia mulato+Lablab while the NDF of 63.86±0.22 in Chloris+Lablab was significantly ($p>0.05$) higher than others. The COP of all the silages was ≥ 1 except Chloris+Lablab. This result reflected that *Brachairia ruziziensis*, *Brachairia* mulato II, *Panicum maximum* and *Chloris gayana* can be ensiled with lablab for quality silages acceptable by goats.

Keywords: *Brachairia* mulato II, *Chloris gayana*, *Brachairia ruziziensis*, *Panicum maximum*, *Lablab purpureus*, silages

Description of the problem

The ongoing challenge of ensuring a continuous supply of fresh forages for animal feeding throughout the year is particularly pressing in developing countries. While high-quality forages flourish abundantly during the wet seasons, they often become scarce afterward. The variability in forage quality and availability can adversely impact feed intake, nutritional value, and ultimately, animal performances. To mitigate these challenges, silage production of forages when available in excess and possess good nutritional values can be employed for use during periods of scarcity [1]. Grasses can be ensiled with leguminous forage to produce high quality silages with greater energy concentration and balanced protein which serves as a valuable feed resource for ruminants. *Lablab purpureus* is an important pasture legume that can be intercropped with various pasture grasses to improve forage quality. It can be ensiled together with grasses, agro-industrial by-products (AIBPs), addictives and other feed materials to produced quality silage [2].

This study was therefore designed to assess the physio-chemical composition of silages made from *Brachairia* mulato II, *Panicum maximum*, *Chloris gayana* and *Brachiaria ruziziensis* with lablab and as well as to determine their preference by West African Dwarf goats.

Materials and method

Silage making: Grasses (*B.* mulato II, *C. gayana*, *B. ruziziensis* and *P. maximum*) were chopped into 2-3 cm pieces and wilted. Each grass was ensiled with *Lablab purpuerus* in the ratio 3:1 to make four dietary treatments: T1=Mulato+Lablab, T2= Brachiaria+Lablab, T3= Chloris+Lablab and T4= Panicum+Lablab. The grass-lablab was packed into polythene bags in triplicates and was allowed to ferment for 28 days and the silages were thereafter opened for quality assessment.

Assessment of silage quality: A thermometer was inserted inside the silage mass for 5 minutes and silage temperature values were recorded. The colour was assessed using a colour chart. A pH meter was used to determine the silage pH.

Silage sample was taken for proximate analysis [3] and fibre fraction [4]. Data collected were analysed using analysis of variance (ANOVA) with the procedure of SAS [5]. The means were separated using Duncan Multiple Range Test at 5% level of probability.

Acceptability study: Twelve (12) West African Dwarf (WAD) goats weighing 8.82± 0.10 kg were used for this study. The animals were allowed free-choice feeding to assess the acceptability of these four (4) silages. Four (4) kg of silages in feeding troughs were made available to the animals. The changing of the positioning of each trough was done daily so that an animal will not stick permanently to a silage or trough. Free choice intake of each silage material by WAD goats was monitored for 6 hours after the silages were offered. The amount of remnants was subtracted from the amount of silage given to calculate silage intake. This study lasted for 7 days.

Results and Discussion

The physico-chemical characteristics of the silage is as shown in Table 1. The Crude protein ranged from 10.06±0.44 in Chloris+Lablab to 12.17±0.31% in Mulato+Lablab. The higher values of crude protein found in Mulato II + lablab and Brachairia+Lablab silages could be because of plant morphology which is characterized by many leaves and because *B.* mulato II is a hybrid of *B. ruziziensis* with excellent quality. This agrees with the findings of [6], when different types of Brachairia (marandu, xaraés, and piatã) were ensiled with and without millet. It was concluded that the highest content of CP obtained in piatã grass silage could be because the grass has thin stems (4mm diameter) and high leaf:stem ratio, therefore, produces better quality forage. The CP obtained in the present study was within the minimum requirement of 100- 180g/Kg DM for ruminants [7]. The high crude protein of all the silages may be attributed to the inclusion of lablab which have lower dry matter and high protein content. The NDF values of *P. maximum* (59.81%) was above 44.7- 56.2 % observed by [2]. The stems of *C. gayana* could be the reason for its high NDF.

The olive green colour of the silages could be an indication that the silages were well preserved. This agrees with the findings of Babayemi, [8], indicating that a well preserved silage of forage origin will have a colour similar to the colour of grasses before they were ensiled. The temperature of the silages obtained was in the temperature range (27^0C -38^0C) of good silage from forages and the pH range (4.26-4.55) obtained was within the acceptable range of 3.5 - 5.5 for good silage [9] which could be an indication that the forages contained enough amount of soluble carbohydrate for good silage preservation.

The Coefficient of Preference in Figure 1 indicated that Mulato II+Lablab, Brachiaira+Lablab and Panicum+Lablab silages were more acceptable by the WAD goats than Chloris+Lablab silage with COP of less than 1. High dry matter intake in Mulato II+Lablab silage as well as Brachiaria+Lablab silage could be as a result of higher crude protein content and the succulent nature of the silages. The nature of stem of *Chloris gayana* could be the reason why it was not well accepted. According to [10], goats have the ability to pick the feeds they preferred if they have access to many feeds. Many factors affect dry matter intake or preference of feed by animals which include factors like toxin content of the feed, the smell or texture of feed and nutritional demand of the animal.

Table 1: CP (%), NDF(%), physical quality, temperature (^{0}C) and pH of grass-lablab silages

Treatments	CP (%)	NDF (%)	Colour	Temp(^{0}C)	pH
Mulato+ Lablab	12.17±0.31	53.39±0.88	Olive green	28.80	4.41
Brachiaria+ Lablab	11.51±0.28	58.76±0.66	Olive green	27.30	4.26
Chloris+ Lablab	10.06±0.44	63.86±0.22	Olive green	28.20	4.55
Panicum+ Lablab	11.01±0.35	59.81±0.31	Olive green	27.50	4.34

Grass: lablab= 3:1

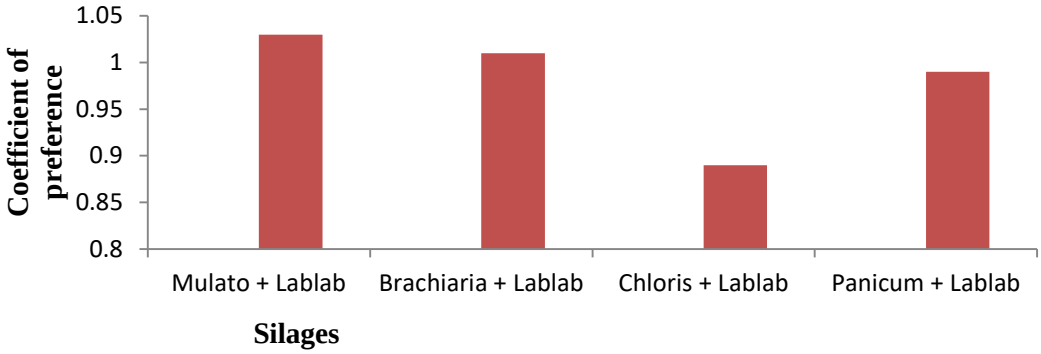

Figure 1: Coefficient of Preference (CoP) of grass-Lablab silages by WAD goats

Conclusion and Application

Mulato II and *Brachiaria ruziziensis* ensiled with lablab in ratio 3:1 can serve as a good source of protein in ruminant diets.

References

1. Olorunnisomo, O.A. and Adesina, M.A. (2014). Silage characteristics, nutritive value and preference of zebu cows for Moringa leaf ensiled with different levels of cassava peel. *Journal of Applied Agricultural Research*, 6(1): 191 -196.
2. Alasa, M.C. 2014. Nutritional assessment of *Panicum maximum* (Jacq.) ensiled with two cultivars of *Lablab purpureus* (*Lablab purpureus* L.) for West African Dwarf Ram. *Ph.D Thesis*, University of Ibadan. Pp.46-91.
3. AOAC, 2000. Association of Official Analytical Chemists. Official Methods of Analysis 17th edition. Washington D.C. USA
4. Van Soest, P. J., Robertson, J. B., and Lewis, B. A. (1991). Methods for dietary fibre, neutral detergent fibre, and non-starch polysaccharides in relation to animal nutrition. *Journal of Dairy Science, 74,* 3583–3597.
5. SAS Institute (2003).The Statistical Analyses System system. v. 9.1. SAS Inst., Cary, NC
6. Costa, K.A. de P., Rosa, B., De Oliveira, I.P., Custódio, D. P. and Silva, D.C. 2005. Effect of seasonal climate condition on the dry matter production and bromatological composition of Brachiaria brizantha cv. Maradu. *Brazilian Animal Science*. 6(3): 187-193
7. National Research Council (2001). Nutrient Requirements of Dairy Cattle. 7th Revised Edition. *The National Academies Press*,Washinton DC.
8. Babayemi, O. J. 2009. Silage quality, dry matter intake and digestibility by West African dwarf sheep of Guinea grass (*Panicum maximum* cv Ntchisi) harvested at 4 and 12 week regrowths. *African Journal of Biotechnology* 8(16): 3983-3988.
9. Menesses, M.D., Megias, J., Madrid, A., Martinez-Teruel, F., Hemandez, J. and Oliva, J. (2007). Evaluation of the phytosanitary, fermentative and nutritive characteristics of the silage made from crude artichoke (*Cynaras colymus* L.) by-products feeding for ruminants. *Small Ruminant Research*, 70: 292-296.
10. Larbi, A., Jabber, M.A., Orok, E.J., Idiong, N.B. and Cobbina, J. (1993). Alchornea cordifolia, a promising indigenous browse species adapted to acid soils in southeastern Nigeria for integrated crop-livestock agroforestry production systems. *Agroforestry Systems*, 22(1): 33 – 41.