

Growth Performance of White Fulani Calves Fed *Rauvolfia vomitoria* (Poison devil's pepper) Leaves and Brewers' Spent-Grain Based Diet

***Uduak D. Etteh, Udoh A. Inyang, Kolawole D. Afolabi and Nsikan J. Ekanem**

Department of Animal Science, University of Uyo, Uyo, Nigeria

*Corresponding Author Email: uddydanni@gmail.com

Abstract

An experiment to evaluate the growth performance of White Fulani Calves fed ensiled Rauvolfia vomitoria (RV) leaves and Brewers' Spent Grain Based diet was undertaken. The ensiling lasted for 21 days. Nine (9) Fulani Calves procured for this experiment were randomly divided into 3 treatment groups of three animals per replicate, such that there was a control diet (Treatment 1) and two treatment diets (Treatment 2 and Treatment 3). Based on body weight, Treatment 1 (control) was fed 3% Concentrate, 0% Silage, and 4% forage; Treatment 2 was fed 3% Silage and 4% forage; and Treatment 3 was fed 4% silage and 3% forage. The experiment was carried out using a Completely Randomized Design (CRD) and lasted for 56 days. The first stage of the experiment had RV included from 20 % - 80 % as against/ratio BSG of 80 % - 20 % and this led to the adoption of the 20% RV and 80% BSG as the most preferred and appropriate silage mixture for the study. In the second stage of the experiment, the study evaluated the effect of feeding White Fulani calves ensiled brewers' spent grain and Rauvolfia vomitoria at 3% and 4% of their body weight on their growth performance. The ensiled brewers' spent grain and Rauvolfia vomitoria had a significant effect ($p < 0.05$) on the weight change, feed intake and feed conversion ratio. The difference in the weight change showed that the calves fed the T3 diets gained the most weight (48.58kg) during the feeding trial, and the change was significantly higher ($p < 0.05$) than those fed T2 (32.65kg) and the control diet (27.55kg), respectively. However, the total dry matter feed intake showed no significant differences, though those on T3 consumed numerically higher than the others. Finally, in the Feed Conversion Ratio (FCR), there was also a significant difference ($p < 0.05$) with the lowest FCR recorded by the calves fed the T3 diets (4.13), and it was significantly ($p < 0.05$) lower than those fed the control diet (5.86). The effect of feeding this 80% BSG and 20% Rauvolfia vomitoria silage to the calves at 4% of body weight resulted in the highest weight gain and the best feed conversion ratio, and is therefore recommended as the optimum level of supplementation.

Keywords: White Fulani calves, Growth performance, *Rauvolfia vomitoria*, Brewers' spent grains, Silage

1.0 Introduction

Ruminant animals including cattle, sheep, and goats make significant and diverse contributions to the socio-economic progress of many nations, especially in developing countries like Nigeria. Kosgey (2004) reported that they are essential for enhancing household nutrition, providing income, and offering other non-tangible advantages such as serving as financial reserves or emergency support systems as well as their roles during traditional and ceremonial events. Their value largely lies in their ability to transform low-quality feed resources such as forages, agricultural by-products, and household leftovers into essential animal products like milk, meat, fibre, and hides. Despite their importance, the sector faces major constraints due to worsening rangeland conditions and economic challenges, particularly in Nigeria, which compromise the availability and nutritional adequacy of livestock feed. These difficulties are intensified by recurring droughts that reduce both the yield and quality of forage. As a result, there is a pressing need to advance research focused on the development and preservation of perennial forage species that are rich in protein and capable of thriving in arid environments. Such forages, supported by deep root systems, are more resilient under drought and can sustain green leaf production during periods of limited rainfall (Julien *et al.*, 2013).

Rauvolfia vomitoria (Afzel., Apocynaceae), commonly referred to as “poison devil’s pepper,” is a perennial shrub that may attain a height of up to 15 m. In Nigeria, it is vernacularly identified as *Asofeyeje* among the Yoruba, *Akanta* among the Igbo, and *Penpe* in Ashanti, Twi, and Wassaw dialects (Ajayi & Ojelere, 2014). Morphologically, the species is characterized by oval to oblong, glossy leaves arranged in whorls, with straight venation, and by clusters of inconspicuous white to greenish flowers that subsequently develop into red berries. The root system is tuberous, enclosed by a pale brown cork. The pharmacological properties of the roots have been attributed primarily to indole alkaloids, most notably reserpine (Amole, 2003). Previous studies have reported variations in the proximate composition of the leaves. Chukwu *et al.* (2015) documented ash, nitrogen, and phosphorus contents of 9.18%, 2.61%, and 0.135%, respectively, in mature leaves of *Rauvolfia vomitoria*. Conversely, Bassey *et al.* (2014) recorded an ash content of 8% and a crude protein concentration of 25.88% in the leaves.

Brewers’ Spent Grain (BSG), a principal by-product of the brewing industry, constitutes a valuable source of high-quality protein, estimated at approximately 29–34% (Thomas *et al.*, 2019). Its energy and fibre fractions, expressed on a dry matter basis, range between 21% and 33% (Mussatto *et al.*, 2006). Owing to its substantial content of cellulose, hemicellulose, and lignin, in addition to readily available sugars and amino acids, BSG has been widely employed as a feed resource for ruminants (Godoy *et al.*, 2018). However, there is limited empirical evidence in literature regarding the nutritional potential of *Rauvolfia vomitoria* and Brewers’ Spent Grain in calves’ diet. The objective of this study was to evaluate the growth performance of White Fulani calves fed *Rauvolfia vomitoria* (RV) leaves and Brewers’ Spent Grain (BSG).

2.0 Materials and Methods

The experiment was conducted at the Cattle Unit of the Teaching and Research Farm of the Department of Animal Science, University of Uyo, Uyo, Akwa Ibom State, Nigeria. Fresh *Rauvolfia vomitoria* leaves harvested from the arboretum of the University of Uyo, Brewers’ Spent Grain from Champion Brewery as well as locally formulated concentrate diets made of

maize, soy bean meal, wheat offal, palm kernel cake, bone meal, V/TM premix and salt were used for this study. The Freshly harvested *Rauvolfia vomitoria* leaves (devoid of the petioles) were chopped into small slices of about 5 cm in length using a kitchen knife, mixed with Brewers' Spent Grain (BSG), stored in polythene nylon bags and ensiled in four tightly-covered 200-litre drums (silos) for 21 days. The ensiling mass was manually compacted to expel air. Further air exclusion was achieved by covering the mass with polythene bags and pressing down with sandbags. In line with the Cafeteria Method (Larbi *et al.*, 1993), in the first stage of the experiment, these four ensiled diets (20%RV+80% BSG; 40%RV+60%BSG; 60%RV+40%BSG; and 80%RV+20%BSG) were fed to the calves to determine which was most palatable.

Table 2.1: Preference of proposed experimental diets

Parameters	20% RV + 80% BSG	40% RV + 60% BSG	60% RV + 40% BSG	80% RV + 20% BSG	SEM
COP	0.79 ^a	0.61 ^a	0.30 ^b	0.08 ^c	0.13

^{abc} Means with different superscripts within a row are significantly different (P<0.005); COP – Coefficient of Preference

According to Table 2.1 above, the ensiled diet with the highest Coefficient of preference (0.79) was the silage composed of 20% RV and 80% BSG. As a result, this ensiled diet was adopted for the feeding trial. *Panicum maximum*, a perennial and easily accessible forage, was used to supplement their diets. Before the onset of the experiment, the pens were cleaned, washed, and disinfected thoroughly. The animals were quarantined and acclimatized. Feed and fresh water were provided *ad libitum* throughout the experimental period, which lasted for 56 days. Medications and the status of vaccination of the experimental calves against peste des petits ruminants (PPR) disease were routinely confirmed, and they were also treated against internal and external parasites. Adequate record-keeping on all aspects of management practices was ensured. Nine (9) Fulani Calves procured for this experiment were randomly allotted to 3 treatment groups using a Completely Randomized Design, such that there was a control diet (Treatment 1) and two treatment diets (Treatment 2 and Treatment 3).

As shown in Table 2.2, Treatment 1 (control) was fed 3% Concentrate, 0% Silage, and 4% forage; Treatment 2 was fed 3% Silage and 4% forage; and Treatment 3 was fed 4% silage and 3% forage. The weight of the calves was determined both at the beginning and the end of the experiment in order to get the initial and final weights of the calves. Weight change was deduced by subtracting the initial weight from the final weight of calves. Daily weight change was calculated by dividing the weight change by the experimental period (56 days). Feed intake was obtained as the total feed consumed during the period of the experiment. It was calculated as the summation of the daily feed intakes, which were determined by deducting the leftover feed from the feed served the previous day. The feed conversion ratio of the calves was deduced by dividing the feed intake by the weight change. All the data obtained were analyzed using a one-way analysis of variance (ANOVA) with the statistical analysis system package (SAS, 1999). Significant differences observed were separated with means as prescribed by the Duncan Multiple Range Test (DMRT) at a 5% probability level.

Table 2.2: Ingredients constituents of the experimental diet

Ingredients	Control (0% Silage)	T2 (3% Silage + 4% Forage)	T3 (4% Silage + 3% Forage)
Maize	40	-	-
Soybean meal	20	-	-
Brewer's Spent Grain + <i>Rauvolfia vomitoria</i> leaves	-	Silage with the best characteristic	Silage with the best characteristic + a little high margin (96.00%)
Silage	-	(96.00%)	
Wheat offal	20	-	-
Palm Kernel Cake	16	-	-
Bone Meal	3.0	3.0	3.0
V/TM Premix	0.50	0.50	0.50
Salt	0.50	0.50	0.50
Total	100	100	100

V/TM Premix = vitamin A, D3, E, K, B1, B2, B6, B12, Niacin, Pantothenic acid, Folic acid, Biotin, Choline, Chloride, Manganese, Zinc, iron, Copper, iodine, selenium, cobalt and Antioxidants.

3.0 Results and Discussion

The proximate composition of silage composed of BSG and *Rauvolfia vomitoria* (RV) leaves is presented in Table 3.1 above. *Rauvolfia vomitoria* leaves were analyzed to be composed of 44.56% moisture, protein (19.33%), lipid (3.96%), fibre (6.64%), ash (8.38%), CHO (61.69%) and caloric value of 359.72 Kcal. The proximate of RV in this study varies slightly from that earlier reported by Chukwu *et al.* (2015), who reported lower moisture (10.87%), higher ash (19.67%), higher fibre (23.56%), lower protein (12.73%), and lower lipid (2.78%). Although these variations do not have a pattern, they can be attributed to the climatic and soil conditions in the states where the crops were grown, and the state of the leaves at the time of the study.

In the same table, the wet BSG used in this study is composed of moisture (22.68%), protein (26.13%), lipid (7.28%), fibre (7.08%), ash (10.68%), CHO (48.86%), and a caloric value of 348.45 Kcal. The crude protein content of BSG in this present study is in line with some earlier studies (Waters *et al.*, 2012 and Meneses *et al.*, 2013) where 20-31% crude protein was reported. It is, however, higher than those reported by Xiros *et al.* (2008) (14.2%) and Mussatto and Roberto (2006) (15.2%). Among all these studies, the ash content (10.62%) reported for brewers' spent grain in this study is the highest and is distantly followed by the 4.6% which was reported by Mussatto and Roberto (2006). Such differences in the proximate composition of BSG can be accounted for by the different malting processes at the brewery, and this has also been suggested earlier in Aliyu and Bala (2011).

The moisture content, crude protein and carbohydrate values in this study are higher than those reported by Ajayi and Ojelere (2013). However, the fat, ash and metabolizable energy found in this report were lower than those reported in the same study. This proximate composition therefore shows that Brewers' Spent Grain has nutritional values that are useful for ruminant production. The proximate composition of the silage (20% RV + 80% BSG) was also found to be around that of the raw materials. It was composed of moisture (31.94%), ash (11.84%), fibre (8.56%), protein (26.6%), lipid (6.01%), carbohydrate (46.95%) and calorie (348.45).

Table 3.1: Proximate composition of BSG, *Rauvolfia vomitoria* leaves and silage

Parameters	20% RV + 80% BSG Silage	BSG	<i>Rauvolfia vomitoria</i>
Moisture (%)	31.94 ± 0.004	22.68 ± 0.003	44.56 ± 0.002
Ash (%)	11.84 ± 0.002	10.62 ± 0.002	8.38 ± 0.003
Fibre (%)	8.56 ± 0.001	7.08 ± 0.001	6.64 ± 0.002
Protein (%)	26.6 ± 0.064	26.13 ± 0.202	19.33 ± 0.074
Lipid (%)	6.01 ± 0.005	7.28 ± 0.003	3.96 ± 0.002
*CHO (%)	46.95 ± 0.060	48.86 ± 0.054	61.69 ± 0.073
Calorie	348.45 ± 0.027	365.60 ± 0.017	359.72 ± 0.014

CHO* - Carbohydrate; ± = Standard Deviation (SD); *Rauvolfia vomitoria* – RV; Brewers spent grains – BSG

This analysis revealed that ensiling was a suitable method of preserving the BSG and *R. vomitoria*, as the nutritional value of the feed ingredients remained intact after ensiling. The silage showed a boost in the crude protein, ash and crude fibre contents as it was higher than both BSG and *R. vomitoria*. The carbohydrate, metabolizable energy and moisture levels were, however, reduced. The reduction in the moisture content of the silage makes it preferable as it will aid the preservation of the silage and protection against spoilage microorganisms (Muck *et al.*, 2020).

In his review, Terefe (2022) reported that the combination of brewery spent grain (BSG) with other feed ingredients in silage making has shown benefits in improving fermentation quality and stability against aerobic deterioration, hence the positive outcome in the silage. Unlike the present study, however, in Unah *et al.* (2014), the combination of cassava and BSG to make silage yielded a declining quality of the silage as the quantity of BSG increased, particularly with increasing ash composition and a declining protein composition.

The growth performance of white Fulani calves fed ensiled brewers' spent grain and *Rauvolfia vomitoria* is as shown in Table 3.2. The table shows that the experimental diet altered ($p < 0.05$) the weight change, feed intake and feed conversion ratio. The difference in the weight change shows that the calves fed the T3 diets gained the most weight (48.58kg) during the feeding trial, and the change was significantly higher ($p < 0.05$) than those on T2 (32.65kg) and the control diets (27.55kg), respectively.

Conversely, the total and daily dry matter intake showed that there were no significant differences ($p > 0.05$), although the calves fed T3 (186.01 kg) was numerically higher than control (161.29kg) and T2 (146.83 kg). Finally, in the FCR, there was also a significant difference ($p < 0.05$) amongst the calves in the three dietary groups. The lowest FCR was recorded by the calves fed the T3 diets (4.13), and it was not significantly ($p > 0.05$) lower than those fed the control diet (5.86) and the T2 diets (4.54). There was, however, no significant difference ($p > 0.05$) between the control and calves fed T2 diets. The findings from this study suggest that the T3 diet is most beneficial to the White Fulani calves, as they were able to gain the most weight per kilogram of feed consumed.

Table 3.2: Growth Performance of white Fulani calves fed ensiled brewers' spent grain and *Rauvolfia vomitoria*

Parameters	Control (0% Silage)	T2 (3% Silage + 4% Forage)	T3 (4% Silage + 3% Forage)	SEM
Initial body weight (Kg)	82.89 ^a	90.69 ^a	95.08 ^a	10.11
Final body weight (Kg)	110.44 ^a	123.34 ^a	143.67 ^a	13.25
Weight gain (Kg)	27.55 ^b	32.65 ^b	48.58 ^a	6.70
Daily weight gain (Kg/day)	0.492 ^b	0.583 ^b	0.868 ^a	0.12
Dry matter conc/silage intake	12.82 ^b	18.42 ^a	12.27 ^b	1.58
Dry matter forage intake	148.47 ^a	128.41 ^a	173.74 ^a	13.76
Total dry matter intake	161.29 ^a	146.83 ^a	186.01 ^a	13.76
DDMI	2.88 ^a	2.62 ^a	3.32 ^a	0.25
Feed conversion ratio	5.86 ^a	4.54 ^{ab}	4.13 ^b	0.40

^{ab} Means with different superscripts within a row are significantly different (P<0.05), SEM Standard error of mean, DDMI Daily Dry Matter Intake.

While this is the first study to ensile BSG with *Rauvolfia vomitoria*, its findings align with some earlier studies (Lao, 2021; Singh *et al.*, 2022) where BSG improved weight gain and feed conversion ratio. The improvement of nutrient utilization of diets for calves on T3 can be linked to the high proximate composition of brewers' spent grain (Aliyu and Bala, 2011). It can also be associated with the prebiotic properties of brewers' spent grain (Lao *et al.*, 2020). Prebiotics are non-digestible polysaccharides present in certain feeds that, when consumed by animals, influence and alter the balance and activities of microbial populations in the gut (Brousseau *et al.*, 2019), with beneficial ones becoming predominant. BSG notably possesses arabinoxylans and β -glucans, which, upon consumption, accentuate the activity of beneficial bacteria. This enhanced microbial activity leads to increased accumulation of short-chain fatty acids (SCFA) in the gut, serving as a principal energy source for anaerobic microbes (Lao *et al.*, 2020). The elevated concentration of SCFA resulting from BSG consumption stimulates various physiological functions, including improved intestinal nutrient absorption, glucose balance, enhanced immunity, and lipid metabolism (Slavin, 2013). It also supports the positive effect of ensiled BSG already reported in earlier studies (Getu *et al.*, 2020). This study has shown the potential of using *Rauvolfia vomitoria* in the calf's diet to promote growth, especially at 20% inclusion and 4% body weight.

4.0 Conclusion

In conclusion, this study attempted to maximize the nutritive values of Brewers' Spent Grain and *Rauvolfia vomitoria* by formulating a silage based on different compositions of the two feed sources. The first stage of the experiment led to the adoption of the 20% RV and 80% BSG as the most preferred and appropriate silage mixture for the study. In the second stage of the experiment, the study evaluated the effect of feeding white Fulani calves ensiled brewers' spent grain and *Rauvolfia vomitoria* at 3% and 4% of their body weight on their growth performance. The 80% BSG and 20% *Rauvolfia vomitoria* silage was characterized by improved levels of crude protein and higher levels of crude fat and ash. The effect of feeding this 80% BSG and 20% *Rauvolfia vomitoria* silage to the calves at 4% of body weight resulted in the highest weight

gain, lower feed intake and the best feed conversion ratio, and is therefore recommended as the optimum level of supplementation. A further study is needed to assess the impact of ensiling/fermentation on a higher percentage of body weight and mature cattle.

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References

- Ajayi, I. A., and Ojelere, O. O. (2013). Chemical composition of ten medicinal plant seeds from Southwest Nigeria. *Advances in Life Science and Technology*, 10, 25-32.
- Ajayi, I. A., and Ojelere, O. (2014). Evaluation of the antimicrobial properties of the ethanolic extracts of some medicinal plant seeds from South-West Nigeria. *IOSR Journal of Pharmacy and Biological Sciences*, 9(4), 80–85.
- Aliyu, S., and Bala, M. (2011). Brewers' spent grain: A review of its potential and applications. *African Journal of Biotechnology*, 10(3), 324-331.
- Amole, O. O. (2003). Blood pressure responses to aqueous extract of *Rauvolfia vomitoria* (Afzel). *Nigerian Journal of Health and Biomedical Sciences*, 2 (1), 50-51.
- Bassey, M. E., Peters, A. A., Etuk, G. E. and Udoh, T. B. (2014). Indigenous Browse Plants used for Goat Production in Akwa Ibom State, Nigeria; Their phytochemical, mineral, nutrient and anti-nutrient content. *International Journal of Plants and Soil Science*. 3(9), 1130-1142.
- Brosseau, C., Selle, A., Palmer, D. J., Prescott, S. L., Barbarot, S., and Bodinier, M. (2019). Prebiotics, mechanisms and preventive effects in allergy. *Nutrients*, 11(8), 1841.
- Chukwu, O. N., Chisom, I. F., Maureen, C. O., Ekwealor, K. U., and Okeke, C. U. (2015). The effect of boiling on the phytochemical and nutritional content of *Rauvolfia vomitoria*. *Journal of Global Biosciences*, 4(6), 2561-2568.
- Getu, K., Getachew, A., Berhan, T., and Getnet, A. (2020). Supplementary value of ensiled brewers' spent grain used as a replacement for cottonseed cake in the concentrate diet of lactating crossbred dairy cows. *Tropical Animal Health and Production*, 52(6), 3675-3683.
- Godoy, M. G., Amorim, G. M., Barreto, M. S., and Freire, D. M. (2018). Agricultural residues as animal feed, protein enrichment and detoxification using solid-state fermentation.

- Current Developments in Biotechnology and Bioengineering*, 235-256.
<http://dx.doi.org/10.1016/B978-0-444-63990-5.00012-8>.
- Julien, C. A., Tirilly, P., Dinneen, J. D., and Guastavino, C. (2013). Reducing subject tree browsing complexity. *Journal of the American Society for Information Science and Technology*, 64(11), 2201-2223.
- Kosgey, I. S. (2004). *Breeding objectives and breeding strategies for small ruminants in the Tropics*. Ph.D Thesis, Wageningen University, Netherlands, Pp. 272.
- Lao, E. J., Dimoso, N., Raymond, J., and Mbega, E. R. (2020). The prebiotic potential of brewers' spent grain on livestock's health: a review. *Tropical Animal Health and Production*, 52, 461-472.
- Lao, E. J. (2021). Scrutinising the opportunities, challenges, and sustainability of Brewers' Spent Grain as a feed source for dairy cattle. *Big Data in Agriculture (BDA)*, 3(2), 56-64.
- Larbi, A. Jabbar, M. A., Orok, E.J., Idiong, E. and Cobbina, J. (1993). *Alchornea cordifolia*. A promising Indigenous browse species adapted to acid soils in Southeastern Nigeria for integrated crop-livestock systems. *Agroforestry System*, 22, 33-41.
- Meneses, N. G., Martins, S., Teixeira, J. A., and Mussatto, S. I. (2013). Influence of extraction solvents on the recovery of antioxidant phenolic compounds from brewer's spent grains. *Separation and Purification Technology*, 108, 152-158.
- Muck, R. E., Kung Jr, L., and Collins, M. (2020). Silage production. Forages, *The Science of Grassland Agriculture*, 2,767-787.
- Mussato, S., Dragone, G. and Roberto, I. (2006); Brewers' Spent Grain; Generation, Characteristics and Potential Applications. *Journal Cereal Science*, 43,1-14.
- SAS (1999). Statistical Analysis System Incorporated, North Carolina, USA
- Singh, P. V., Ghosh, M. K., Mahesh, M. S., and Chatterjee, A. (2022). Zoo-technical responses of growing cattle fed sun-dried brewers' spent grain at 20% of dietary inclusion. *Bulletin of the National Research Centre*, 46(1), 1-8.
- Slavin, J. (2013). Fibre and prebiotics, mechanisms and health benefits. *Nutrients*, 5(4), 1417-1435.
- Terefe, G. (2022). Preservation techniques and their effect on nutritional values and microbial population of brewer's spent grain, a review. *CABI Agriculture and Bioscience*, 3(1), 51.
- Thomas, M., Hersom, M., Thrift, T., and Yelich, J. (2024). Wet brewers' spent grains for beef cattle. Publication No. AN241. DOI: 10.32473/edis-an241-2010. UF/IFAS Extension. [Http://edis.ifas.ufl.edu/publication/AN241](http://edis.ifas.ufl.edu/publication/AN241) accessed 20/04/2025.

- Unah, U. L., Inyang, U. A., and Solomon, I. P. (2014). Quality, hydrocyanic acid content and acceptability of cassava peels ensiled with brewers' spent grains. *Net Journal of Agricultural Science*, 11(2), 25-28
- Waters, D. M., Jacob, F., Titze, J., Arendt, E. K. and Zannini, E. (2012). Fibre, protein and mineral fortification of wheat bread through milled and fermented brewer's spent grain enrichment. *European Food Research and Technology*, 235, 767-778.
- Xiros, C., Topakas, E., Katapodis, P. and Christakopoulos, P. (2008). Hydrolysis and fermentation of brewer's spent grain by *Neurospora crassa*. *Bioresource Technology*, 99(13), 5427-5435.