Proceedings of 30th Annual Conference of ASAN 2025, Abuja, Nigeria (755-759)

EFFECT OF TREATED *Sorghum cultivar* (MASAKWA) STOVER SUPPLEMENTED WITH GRADED LEVELS OF *Eichhornia crassipes* (WATER HYACINTH) ON GROWTH PERFORMACE OF YANKASA RAMS

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Abstract
The study investigated the dry matter intake (DMI), live weight gain (LWG), water intake (WI) and feed conversion ratio (FCR) of Yankasa rams fed treated sorghum cultivar (Maskwa) Stover supplemented with graded levels of water hyacinth. The experiments were conducted at Federal College of Education Yola Teaching and Research farm. The objective of the study were to determine the dry matter intake (DMI), live weight gain (LWG), water intake (WI) and feed conversion ratio (FCR). The weights of the animals were measured before the commencement of the experiment and weekly weight gain were also taken. The formulated diets were offered at 08.00 to 09.30 am and 03:00 to 03: 30pm. T_1 (control) = Molasses treated masakwa Stover, T_2= Molasses treated masakwa Stover plus 100g of water hyacinth, T_3= Molasses treated Masakwa Stover plus 200g of water hyacinth and T_4= Molasses treated masakwa Stover plus 300g of water hyacinth. The dry matter intake ranged from (844.69 to 947.69 gram/anima/day), total weight gain recorded (297.50 to 385.60kg), water intake recorded (2.89 to 3.25l/h/day) and feed conversion ratio (2.03 to 5.20) which showed significant difference ($P<0.05$) among the treatment. Therefore, the result of this study showed that treated Masakwa Stover supplemented with water hyacinth should be used as a diet for Yankasa rams since the inclusion of these feeds had positive effects on dry mater intake 947.69 gram //animal/day live weight gain (57.78 ram/animal/day) and feed conversion ratio (2.03) of the animals. Farmers can use 300g of water hyacinth to supplement Molasses treated Masakwa stover to feed rams.

Key: Molasses, Masakwa stover, water hyacinth, Yankasa rams, supplement.

Description of Problem

Livestock are fed with diverse feed resources all over the world (1). In Nigeria, the major feed resources are the crop residues and grass hay which contains poorly digestible nutrients. To ensure better body condition of the animals it is advisable that additional sources of carbohydrate and nitrogen be included in the diet of the animals thereby improving the utilization of crop residues, which is mainly attained through the supply of energy and nitrogen to rumen microbes (2). Though crop residues are low in nutrients such as nitrogen, calcium, phosphorus have slow microbial degradation (3). Supplementation of ruminant animals fed low quality roughages with carbohydrate and protein feed such as molasses-urea could be used to improve the protein, carbohydrate need by the animals and bioavailability of nutrients (4). Masakwa is one of the major staple food in Adamawa State, produce in large quantities, thereby producing large quantity of fodder that sometimes are not properly utilized in the feeding process of livestock. (5). The objective of the study was to determine the dry matter intake, live weight changes and water intake of feeding molasses treated Masakwa Stover supplemented with graded levels of water hyacinth on the performance of Yankasa rams.

Materials and methods

Experimental site

The experiment was conducted at Chouchi river valley farm site along Yola - Jimeta road, Adamawa State, Nigeria.

Composition of Supplementary and Basal Diets

The compositions of the diets were basal diet T_1 (control) = Molasses treated masakwa stover
While the supplementary diets were different grams of *Eichhornia crassipes* (water

hyacianth) was assigned at graded levels according to the treatment. The molasses was added at the rate of 5% of which was sprinkled at 20kg Masakawa Stover T_1 (control) = Molasses treated masakwa Stover, T_2= Molasses treated masakwa Stover plus 100g of water hyacinth, $T_{3=}$ Molasses treated masakwa Stover plus 200g of water hyacinth and T_4= Molasses treated masakwa Stover plus 300g of water hyacinth

Experimental Design and Treatment

Twenty (20) experimental Rams were allocated to four treatments with five rams per treatment. Each of the Ram was randomly assigned to a treatment and four replicates. Complete Randomize Design (CRD) was used. The Basal diet was treated with 5% molasses and supplemented with graded levels of water hyacinth. The weights of the rams used in the experiment were 19.10 kg in treatment T_1, 19.10 in treatment T_2, 19.10 in treatment T_3 and 19.10 in treatment T_4. These were the average weight of five (5) rams per treatment which were balanced before commencement of the experiment.

Proximate Analysis of the Experimental Diet

The proximate composition of the experimental diets was determined using the proximate analysis according to Association of Official Analytical Chemist (6).

Data Collection

The data collected during the feeding trial was daily feed intake, water intake and the weight gain for each animal were taken weekly throughout the feeding trial

Chemical and statistical analysis

The chemical composition of Maskwa plant, Water hyacinth, Molasses and faeces were determined using the proximate analysis according to Association of Official Analytical Chemists (7), and all Statistical *data* collected were subjected to the SPSS soft way version 16 to analyse the statistical data collected in this study

Results and Discussion

Chemical composition and anti-nutritive factor of masakwa Stover

The result of chemical composition of treated Sorghum cultivar (Masakwa) Stover supplemented with *Eichhornia crassipes* (water hyacinth) is presented in Table 1 and 2. According to the result, the dry matter (DM) of masakwa plant (93.17%) is lower than 96.50% reported by (8), the lower value could be attributed to the environment, seed variety, and type of soil, climate and time of harvest. The crude protein (CP) was 19.72% similar to 20.25% reported by (9). The crude protein contents of experimental diets (19.72%) recorded in this research exceeds the recommended range of 9 to 14% as minimum requirements for maintenance and production for animals as reported by (10) and higher than the value (12.6%) recommended by (11). The crude fiber (CF) and ether extract (EE) of Masakwa were 30.89% and 2.05% respectively and less than 32.00% CF and higher than 1.00% EE reported by (12). Similarly the Ash (ASH), Acid Detergent Fiber (ADF) and Neutral Detergent Fiber (NDF) of Masakwa were 21.73%, 38.22 % and 48.83% respectively. The values were higher than 9.17% (Ash), 36.20 % Acid Detergent Fiber (ADF) and less than 72.23% Neutral Detergent Fibre (NDF) as reported by (3) but similar to 51.20% in (13). The differences might be attributed to environment, variation in soil and climate. The recorded anti-nutritive factor of Masakwa stover was 0.82% (Tannin) which was lower than the value 2.40% as reported by (14). The saponin was 1.06% which corresponds with the figure 1.05% reported by (14). The alkaloid of Masakwa plant were 2.16% higher than the value required by growing ruminants (15). This might likely affect growth rate and other features that lead to production. It also showed that as the plants grow, its toxicity level also increases which agrees with (16).

Chemical Composition of Water Hyacinth

The chemical composition of water Hyacinth is presented in Table 3. The crude protein (CP) of water hyacinth was 19.72% higher than the value 10.42% (CP) reported by (17) and 14.00% (CP) reported by (17), the leafy parts of water hyacinth usually contain 25 – 35% crude protein on a dry weight basis. The level of CP in the whole plant without root is higher than the critical level of 7.0 g /100 g DM below which feed intake will be depressed; this was as a result of absorbing waste material present in the body of water (18). (19) emphasize that due to good nutrient profile, water hyacinth can be used to supplement the low nutrient value of tropical grasses and also all of the essential amino acids were present at high levels in the leaf protein isolate. The Neutral Detergent Fibre (NDF) content of water hyacinth leave

and the entire plant in this study were (48.83 %) higher than the value of 48.30% Neutral Detergent Fibre (NDF) reported by (20) and (21).

Dry Matter Intake

The results of the dry matter intakes showed significant (P<0.05) difference across the treatments is presented in Table 5 The values 844.69 to 947.69 gram/head/day recorded were lower than the value 959.95 to 1307.58 g/h/day reported by (22) when the authors fed *Penisetum pedicellatum* supplemented with wheat offal to Yankasa sheep. The observed low dry matter intake recorded might be due to the presence of some anti-nutritional factors such as saponin and alkaloids.

Live weight gain

The average daily live weight gain of ram showed significant (P< 0.05) difference across the treatments as presented in Table 5. The recorded value (1.80 to 5.20kg) was lower than the values (14.9 to 96.3kg) as reported by (23) when the authors fed Gamba grass to determine the feed intake, digestibility and growth performance of Washera sheep. The lower value might be attributed the high level of tannin present in the feeds.

Feed conversion ratio

Feed conversion ratio showed significance (P<0.05) difference across the treatment as presented in Table 5. (12), reported that low feed conversion ratio may lead to profitable feed production. The recorded value (2.03 to 5.20) in this study were lower than the values (5.68 to 11.51g) as reported by (22) when the author fed cassava peels to Uda Rams. The values compare equally with the values (14.21 to 22.18) as reported by (18).

Water intake

The recorded value showed the performance of Yankassa rams fed masakwa stover and graded levels of water hyacinth is presented in Table 5. The values 2.89 to 3.25l/h/day of the daily water intake were higher than the value of 1.92 to 2.00l/h/day reported by (23) when the authors determined the growth of Yankasa sheep fed congo grass (*Bracheria muzizeiensis*) The higher value T_4 water intake recorded in this study might be attributed to higher feed intake recorded in T_4.

Table 1: Proximate Composition of Masakwa Plant for a period of 16 Weeks (%)

WEEKS	DM	CP	CF	EE	NFE	ASH
16	92.43	10.60	20.36	2.29	43.69	15.31
SEM	0.89	0.65	0.59	0.19	1.05	0.41

KEY: DM= Dry Matter, CP=Crude Protein, CF= Crude Fiber, EE= Ether Extract, NFE = Nitrogen Free Extract.

Table 2: Anti-Nutritive Factor of Masakwa Plant (%)

Weeks	Tanin	Saponin	Alkaloid
16	1.57	1.81	2.18
SEM	4.04	0.11	0.12

Table 3: Proximate composition of Water hyacinth (%)

DM	CP	CF	EE	ASH	NFE	ADF	NDF	OM	TDN
93.17	19.72	30.89	2.05	21.73	18.78	38.22	48.83	71.44	74.0

KEY: DM= Dry Matter, CP=Crude Protein, CF= Crude Fiber, EE= Ether Extract, NFE= Nitrogen Free Extract, ADF= Acid Detergent Fiber, NDF = Neutral Digestible Fiber.

Table 4: Proximate Composition of Molasses (%)

Moisture	DM	ASH	CP	EE	CF	NFE
24.17	75.8	6.48	0.06	6.1	0.0	87.36

KEY: DM= Dry Matter, CP=Crude Protein,EE= Ether Extract, CF= Crude Fiber, NFE = Nitrogen Free Extract

Table 5: Effect of Molasses Treated Masakwa Stover Supplemented With Graded Levels of Water Hyacinth on Growth Performance of Yankasa Rams

PARAMETER	T_1	T_2	T_3	T_4	SEM
IWG (kg)	19.10	19.10	19.10	19.10	1.51^{NS}
FWG (kg)	20.90^{d}	21.00^{c}	22.30^{b}	24.30^{a}	1.20**
TWG (kg)	1.80^{d}	1.90^{c}	3.10^{b}	5.20^{a}	0.80^{**}
ADWG(g/a/d)	20.00^{d}	21.11^{c}	34.44^{b}	57.78^{a}	0.01^{**}
TDMI(g/a/d)	844.69^{d}	850.49^{c}	883.18^{b}	947.69^{a}	41.74^{**}
ADFI(g/a/d)	9.39^{d}	9.45^{c}	9.81^{b}	10.53^{a}	0.16^{**}
TWI (L)	297.50^{d}	311.60^{c}	370.70^{b}	385.60^{a}	0.90**
DWI (l/h/d)	2.85^{c}	3.01^{d}	3.12^{b}	3.25^{a}	1.30*
FCR	5.20^{a}	4.97^{b}	3.16^{c}	2.03^{d}	0.56**

Key= NS= Not-significant (<0.05) **=highly significant *=Significant, IWG=Initial weight gain, FWG= Final weight gain, TWG= Total Weight gain, ADWG=Average daily weight gain, TDMI=Total dry matter intake, ADFI=Average daily feed intakes, TWI= Total water intake, DWI= daily water intake, FCR=Feed conversion ratio and (g/a/d) = Grams per animal per day.

Conclusion and Application

Feeding Yankasa rams with experimental diets in treatment T_4 resulted to the high dry matter intakes (947.69) g/h/a, daily live weight gain (57.78) g/h/a and better feed conversion ratio (2.03) and the best inclusion level of water hyacinth in this study is T_4(300g) for feeding Yankasa rams.

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