

**NSAP****47th Annual
Conference
(JOS 2022)****CONFERENCE
PROCEEDINGS****THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES****NUTRITIVE VALUE OF MAIZE AND SORGHUM FODDER GROWN UNDER
HYDROPONICS FODDER PRODUCTION IN DADIN-KOWA GOMBE****¹NASIRU, H. A., ²BABAWURO, Y., and ³MOHAMMED, K. Y.****¹Federal College of Horticulture Dadin kowa (FCH DK)****²Federal University of kashere (FUK) Gombe State****³Federal College of Horticulture Dadin kowa (FCH DK)****(nasir3472@mail.com)****ABSTRACT**

Production of hydroponics fodder involves growing of plants without soil but in water or nutrient rich solution in a greenhouse (hi-tech or low cost devices) sometimes for a short duration (approx. 7 days). This study was carried out to evaluate the effect of different harvesting time on the proximate of maize and sorghum fodder produced under hydroponic system. Maize and sorghum were harvested on the 7th and 14th days after sowing. All the nutrient composition of maize have significant difference ($p < 0.05$) except moisture and carbohydrate. The crude protein (CP) of maize is significantly ($p < 0.05$) higher in week two having (9.31%) while the crude fibre (CF) is significantly higher in week one. Sorghum CP is highly significance ($p < 0.05$) in week two with (13.59%). While CF is higher in week one having (17.26%) All the nutrient compositions of Sorghum are significantly difference except Moisture, EE and NFE. The hydroponically grown maize and sorghum at both 1st and 2nd week of planting appear to have the potential for feeding livestock. Moderate protein combine with relatively higher fiber would make them to be high quality livestock feed for ruminant animals especially during the dry season.

Keyword: Hydroponics fodder, nutrient solution, sprouting.

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2 INTRODUCTION

The main problems in producing green fodder emanates from reducing land size for fodder cultivation, labor requirements, shortage of water and elevated cost of fertilizers (FAO, 2015). Moreover, lack of constant quality green fodder throughout the years magnifies restricts of sustainable livestock farming. Now a day's scarcity of land has been shown as a great constraint of forage production for ruminant animals like sheep, goat and cattle. The ruminant animals cannot always be dependent on cereal grains like that of monogastric animals. Having these and other problems in mind, alternative technologies like the hydroponics found critical (Naik and Singh 2013, Naik *et al* 2014, Naik *et al.*, 2015). Using this technology to produce livestock feed leads to improvement of livestock performance (Rodriguez, 2004). The increase in livestock production demands nutrient requirement to feed animals. Reproductive performance of the animals also increases through feeding green fodder. Subsequently, feeding green fodder improve livestock products (Dung *et al.*, 2010). This technology gives a guarantee for sustainable forage production and with suitable price (Naik and Singh 2013). It is a technique of growing crops without use of chemicals and artificial growth agents. It is usually characterized by short growth period with around 7-10 days and need of a small piece of land for production (Mooney, 2005). It has extraordinary protein, vitamins, fiber and mineral contents with their healthy beneficial effects on

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animals (Boue *et al.*, 2003). Therefore, this technology is an important agricultural technique currently used in many countries (Turdor *et al.*, 2003).

MATERIALS AND METHODS

Study Location

The study was conducted at Research and Teaching Farm of Federal College of Horticulture located in Dadin-kowa along Gombe-Biu Road in Yamaltu-Deba local Government area of Gombe state. Dadin- kowa lie about 35 kilometers away from Gombe and is located in the Sudan savanna Ecological zone of Nigeria on latitude of 10° 18E Longitude 11° 31N and on the altitude of 218 meters above sea level.

Experimental Method

The seed were threshed and graded. The good ones were soak in clean water for 4 hours and incubated in a sealed plastic container for 48 hours. The seed started sprouting and they were distributed evenly on aluminum trays for proper growth. The fodders were water three times daily for the period of the study using watering can. The experiment lasted for the period of two weeks, data were collected at the first week and also at the end of the second week.

Proximate Analysis

Sample collected were taking for proximate analysis and were oven-dried at 60 °C for 72 h to determine Dry matter (DM) concentration. Crude fiber (CF), Nitrogen was determined by the Kjeldahl method (AOAC 1990). Ash concentration was determined according to AOAC (1990).

Data Analysis

The data were analyzed using T-test with SPSS statistical package version 27.0. Separation of treatment means was done using Duncan multiple range.

Result and Discussion

Table 1 shows the proximate composition of hydroponically grown maize. The CP of maize indicate a significantly difference ($p < 0.05$) higher in week two having (9.31%), which is less than the result (13.57%) reported by (Naik *et al.*, 2015) This may be as a result of environmental changes or the variety of the maize, while crude fibre (CF) is significantly ($p < 0.05$) higher in week one having (2.10%). All the nutrient composition of maize have significant difference ($p < 0.05$) except moisture and carbohydrate. Table 2 shows the proximate composition of hydroponically grown sorghum. The crude protein (CP) of sorghum is highly significance ($p < 0.05$) in week two with (13.59%) which is higher than the value reported by (Sneath *et al.*, 2003) who reported a CP of (4.92%) at 1st week of sprout. The increase in CP content of sorghum may be attributed to the loss in dry matter particularly carbohydrate through respiration during germination and thus longer sprouting time is responsible for greater losses in dry matter and increases in protein content. CF is higher in week one with (17.26%) which is higher than the result reported by (Dung *et al.*, 2010). but lower than the range of 7.35 – 21.20% reported by (Naik *et al.*, 2015). All the nutrient



compositions of Sorghum are significantly difference except Moisture, EE and NFE. The use of nutrient solution enhance the CP content of hydroponics fodder higher than the tap water which may be due to the uptake of nitrogenous compound (Dung *et al.*, 2010)

Table 1: t-Test of between weeks comparison of nutrient composition of maize

Parameters	Week 1	Week 2	t-value	Sig.
Moisture	0.86 ^b	0.96 ^a	-2.83	0.11
Ash	0.33 ^a	0.25 ^b	11.31	0.01
Crude protein	5.67 ^b	9.31 ^a	-115.11	0.00
Ether extract	4.27 ^b	4.71 ^a	-13.59	0.01
Crude fiber	2.10 ^a	1.54 ^b	7.90	0.02
Carbohydrate	67.87 ^b	69.39 ^a	-2.23	0.16
Nitrogen free extract	88.87 ^a	84.48 ^b	88.83	0.00

^{ab}= Means in a row with different superscript are significantly different($p < 0.05$)

Table 2: t-Test of between weeks comparison of nutrient composition of Sorghum

Parameters	Week 1	Week 2	t-value	Sig.
Moisture	1.36 ^a	1.21 ^b	-2.74	0.11
Ash	0.89 ^a	0.39 ^b	45.17	0.00
Crude protein	8.20 ^b	13.59 ^a	-168.51	0.00
Ether extract	3.98 ^a	3.17 ^b	0.54	0.65
Crude fiber	17.26 ^a	13.91 ^b	43.83	0.00
Carbohydrate	70.00 ^a	67.73 ^b	16.50	0.00
Nitrogen free extract	87.30 ^a	81.64 ^b	-0.98	0.43

^{ab}= Means in a row with different superscript are significantly different($p < 0.05$)

CONCLUSION

It can be concluded from the results of this study that the hydroponically grown maize and sorghum at both 1st and 2nd week of planting appear to have the potential for feeding livestock. Moderate protein combine with relatively higher fiber would make them to be high quality livestock feed for ruminant animals especially during the dry season.

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