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### Performance and Economics of Production of Broiler Chicks Fed Varying Levels of Dried Sorrel (*Hibiscus subdariffa*) Leaves as Source of Fibre

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#### Abstract

An experiment was conducted to assess the performance and economics of production of broiler chicks fed Dried Sorrel Leaves (DSL) as a source of fibre. 120day old chicks were randomly allotted to six treatments in which DSL was used to replace wheat offal at 0, 20, 40, 60, 80 and 100% in the broiler starter diet. The chicks were reared on six isocaloric and isonitrogenous diets. Each treatment was replicated twice in a completely randomized design. Results showed that daily feed intake, daily weight gain and feed conversion ratio were not affected by the different levels of DSL ( $P>0.05$ ) at the starter phase. It was concluded that DSL can be included at higher levels to reduce the cost of production.

**Keywords:** broilers, Dried Uncultivated Sorrel Leaves, Performance, Economics of production

#### Introduction

Sorrel plant (*Hibiscus sabdariffa*) is an acid tasting herb of the Malvaceae family (James, 2003; Yadong *et al.*, 2005). *Hibiscus sabdariffa* locally known as “Yakuwa” is a well-adapted crop in the semi-arid zone of West Africa including Nigeria and it is generally planted as a border crop. Sorrel leaves are used in various food production processes such as in seasoning, salad substitute, flavoring, tea, soups, sauce, spices and pot herb (Rich, 2004; Yadong *et al.*, 2005). The leaves are used for animal fodder and fibre (Plotto, 2004). Nnam and Onyeke (2010) reported that on wet (fresh) weight basis the leaf contained traces of phytate, tannins and cyanide and processing methods such as drying, frying, baking, microwave cooking, and extrusion cooking, among others are effective in removing some of these phytochemicals. The plants appear to be weed in many farms of north eastern Nigeria where weeding is a serious problem to the farmers. Incorporating it into poultry feed will add value to the crop.

This study investigated the effect of feeding different levels of sorrel leaves on the growth and economic performance of broiler chicks.

#### Materials and Methods

This experiment was conducted at the poultry unit of school of undergraduate College of Education farm, Azare, Katagum local government area of Bauchi State. Katagum local government is situated on the northern part of Bauchi state, Nigeria. It is located between latitudes 11°42' and 11°40' and longitude 10°31' and 10°11' east (Anonymous, 2009). A total of 120 one week old broiler chicks were randomly allotted to six treatment groups replicated twice in a completely randomized design (CRD). The chicks were reared on six isocaloric and isonitrogenous diets. DSL was used to replace wheat offal at 0, 20, 40, 60, 80 and 100 % in Diets T1, T2, T3, T4, T5 and T6, respectively. T1 served as control diet. The composition of the experimental diet is given in Table 1. The study lasted for four weeks. Normal routine husbandry practices were observed. The daily feed intake was obtained by subtracting the left-over from total amount of feed supplied. Each bird was weighed at the inception of the experiment and weekly thereafter to obtain the weekly and daily weight gain throughout the experimental period. The feed conversion ratio was calculated as the feed intake per unit weight gain. Economic parameters were based on prevailing market condition in Azare at the time of experiment.

The data generated were subjected by analysis of variance technique (Steel and Torrie, 1980) and where significant differences existed, Duncan's multiple range test was used to separate the means.

#### Results and Discussion

The performance characteristics are shown in Table 2. Results showed that there was no significant difference ( $P>0.05$ ) in the daily feed intake, daily weight gain, feed conversion ratio and feed efficiency ratio ( $P>0.05$ ). This implies that broiler chicks can utilize up to 10 % sorrel leaves like they utilized the wheat offal (control diet). This result is consistent with the earlier reports of Maidala and Ajighigh (2013) and Mohammed *et al.* (2016) who reported no significant difference in broiler chickens fed different fibre sources. The economics of production is presented in Table 3 and results showed that feed cost per kg, total feed cost (N/kg) and total feed cost kg gain (N/kg) decreased as the level of uncultivated sorrel leaves increased in the diets thereby reducing the cost of production. Maidala and Bakoji (2016) reported the reduction of total feed cost and total feed cost N/kg at higher inclusion of millet hulls as a source of fibre in broilers diet.

Table 1: Percentage composition of experimental diets at starter phase (1-4weeks)

Ingredients	Control	20%	40%	60%	80%	100%
Maize	45.25	45.25	45.25	45.25	45.25	45.25
Soya bean	35.85	35.85	35.85	35.85	35.85	35.85
Wheat offal	10.00	8.0	6.00	4.0	2.00	00.00
Sorrel leaves	0.00	2.00	4.00	6.0	8.00	10.00
Fish meal	5.00	5.00	5.00	5.00	5.00	5.00
Bone meal	3.00	3.00	3.00	3.00	3.00	3.00
Lysine	0.20	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20	0.20
Salt (NaCl)	0.25	0.25	0.25	0.25	0.25	0.25
Premix *	0.25	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00	100.00
Calculated analysis						
Crude protein (%)	23.00	23.00	23.00	23.00	23.00	23.00
Metabolizable energy	2800	2800	2800	2800	2800	28.00
Crude fibre (%)	4.56	4.56	4.56	4.56	4.56	4.56

\*Each kilogram contains; vit. A, 10,000,000 IU, vit. D<sub>3</sub> 2,000,000 IU, Vit. E 23,000mg, Vit. K<sub>3</sub> 2,000mg, Vit. B<sub>1</sub> 1,800mg, Panthothenic Acid 7,500mg, Vit. B<sub>6</sub> 3,000mg, Vit. B<sub>12</sub> 15mg, Folic acid 750mg, Biotin 11260mg, Choline Chloride 300,000mg, Cobalt 200mg, Copper 3,000mg, Iodine 1,000mg, iron 20,000mg, Manganese 40,000mg, Selenium 200mg, Zinc 30,000mg, Antioxidant 1,250mg

Table 2: Performance of broiler chickens fed sorrel leaves as source of fibre at starter phase (1-4weeks)

Parameters	Control	20%	40%	60%	80%	100%	SEM
1 2 3 4 5 6							
Initial weight (g/bird)	95.21	96.37	95.82	96.11	97.11	96.21	1.26
Final body weight (g/bird)	470.97	421.17	440.22	457.03	399.79	466.49	42.17
Daily feed intake (g)	54.21	54.20	53.11	53.10	52.12	50.11	4.21
Daily weight gain (g)	13.42	11.60	12.30	12.89	10.81	12.51	2.61
Feed conversion ratio	4.04	4.67	4.31	4.11	4.81	4.00	0.52
Feed efficiency ratio	0.24	0.21	0.23	0.24	0.21	0.25	0.03
Mortality	0	2	0	0	2	0	-

SEM= Standard error of means, \*= (p<0.005).

Table 3: Economics of production of broiler chickens fed sorrel leaves as source of fibre

Parameters	Control	20%	40%	60%	80%	100%	SEM
1 2 3 4 5 6							
Initial weight (g/bird)	95.21	96.37	95.82	96.11	97.11	96.21	1.26
Final body weight (g/bird)	1364.51	1320.25	1328.38	1330.91	1382.87	1421.51	87.21
Cost per kg feed (₦/kg)	120	110	100	90	80	70	NSA
Total feed cost (₦/kg)	518	481	424	379	336	289	NSA
Total weight gain (kg)	1.27	1.22	1.23	1.23	1.29	1.31	NSA
Cost per kg gain (cost of gain ₦ /kg)	407.87	394.26	344.72	308.13	260.47	220.61	NSA

SEM= Standard error of means, \*= (p<0.005), NSA= Not statistically analyzed

## Conclusion and Recommendation

Based on the results of this study, it can be concluded that dried sorrel leaves can be used as a source of fibre in broiler chickens and higher level of inclusion is recommended in order to reduce the cost of broiler production.

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