

## PERFORMANCE OF FINISHER BROILER CHICKENS FED DIETS CONTAINING GRADED LEVELS OF DECORTICATED RAW SANDBOX (*Hura crepitans*) SEEDS AS ORGANIC SOURCE OF METHIONINE

<sup>1</sup>Jimoh, A\* and <sup>2</sup>Kolade, I. O.

<sup>1</sup>Department of Animal Nutrition, Joseph Sarwuan Tarka University (Formerly Federal University of Agriculture), Makurdi, Nigeria

<sup>2</sup>Students' Industrial Work Experience Scheme (SIWES) Unit, University of Ilorin, Ilorin, Nigeria

\*Corresponding author: [abdulhameedjimoh@gmail.com](mailto:abdulhameedjimoh@gmail.com)

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### ABSTRACT

One hundred and twenty (120) four-week old broiler chickens were used in a feeding trial to investigate the performance of finisher broiler chickens fed diets with graded levels of sandbox seeds (SBS) as source of methionine. Four diets were formulated such that D1, D2, D3 and D4 respectively contained 0.2% DL-methionine + 0% SBS, 0.1% DL-methionine + 2% SBS, 0.05% DL-methionine + 4% SBS and 0% DL-methionine + 6% SBS as source of methionine. Data were collected on feed intake, final weight and weight gain while feed conversion ratio was calculated. Data were subjected to one-way analysis of variance (ANOVA) while treatments' means were separated using Duncan Multiple Range test. Results showed that SBS-supplemented diets were not significantly ( $P > 0.05$ ) different in their effects on feed intake while diet D2 (0.1% DL-methionine + 2% SBS) was also not significantly different from the control ((0.2% DL-methionine + 0% SBS). The treatments were not significantly different ( $P > 0.05$ ) in their effects on final weight, weight gain and feed conversion ratio. It is concluded that sandbox seeds can be included at 6% in broiler finisher diets and it can serve as an alternative to synthetic DL-methionine in the supply of dietary methionine.

**Keywords: Broilers, Methionine, Sandbox Seeds, Decorticated, Performance**

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### INTRODUCTION

The need for precision formulation in broiler production cannot be overemphasized. Proteins are high molecular weight substances made up of carbon, hydrogen, oxygen, nitrogen and sometimes sulphur. They are essential for both structure and functions of every living cell. Excess nitrogen based on crude protein formulation is excreted into the environment and have been implicated in pollution, climate change and global warming (FAO, 2017). Ammonia, nitrogen (I) oxide and other oxides of nitrogen emissions are of concern from poultry production and these have been attributed to sources like feed, bedding materials and the animal itself. Poultry production is responsible for about 8% of total greenhouse gas emissions from livestock (Gerber *et al.*, 2013). NRC (1994) reports that poultry birds do not require crude protein *per se* but require amino acids which are the building blocks of protein. Among the amino acids, lysine and methionine are not only classified as essential amino acids but also as limiting amino acids because of their importance in the initiation of protein synthesis. These amino acids are also not in abundant in the regularly used conventional feedstuffs like soya bean which contains 0.6% methionine (Ogundipe *et al.*, 2022) and they need to be provided through feed for optimum growth and wellness of the birds. There is also the concern for the replacement of synthetic materials with organic ones. These reasons have necessitated the search for alternative sources of methionine. Sandbox (*Hura crepitans*) seeds (SBS) is reported to have methionine content of 1.34 (Jimoh *et al.*, 2023) and this is more than that of the conventional and very important soya bean meal. This study was therefore designed to evaluate the use of SBS as a source of methionine in broiler production with special focus on growth performance parameters.

### MATERIALS AND METHODS

The study took place at Livestock Teaching and Research Farm of Joseph Sarwuan Tarka University (formerly Federal University of Agriculture), Makurdi, Benue State, Nigeria. Matured sandbox fruits were harvested by plucking from the sandbox trees within the Campus of the University and also from Makurdi metropolis. They were broken to remove the seeds and the seeds were decorticated, sundried and milled. Proximate and amino acid values were used as reported by Jimoh *et al.* (2023) and Fowomola and Akindahunsi (2007). Four isonitrogenous and isocaloric broiler finisher diets were formulated to contain 0%, 2%, 4% and 6% of Sandbox seeds (SBS) and labelled as D1, D2, D3 and D4, respectively for the dietary treatments as shown in Table 1.

One hundred and twenty (120) four-week old broiler chickens of uniform weight were randomly allocated to the four dietary treatments (D1, D2, D3 and D4) in a completely randomized design with three replicates per treatment and ten birds per replicate. Feed and water were supplied *ad libitum* throughout the 28-day experimental period, and the experiment was conducted in a cleaned and disinfected deep litter house. Data were collected on growth performance parameters namely feed intake, weight gain and Feed Conversion Ratio (FCR). All data collected

were subjected to one-way analysis of variance (ANOVA) suitable for a Completely Randomized Design using Statistical Package for Social Sciences (SPSS, 2011). Treatment means were separated using Duncan Multiple Range test (Duncan, 1955) at 5% significance level.

**Table 1: Composition of Experimental Finisher Broiler Diets**

Feedstuffs (%)	Treatments			
	D1	D2	D3	D4
Maize	60	59.5	59	58
Palm oil	0.7	0.7	0.5	0.5
Sandbox Seeds	0	2	4	6
SBM	20	18	18	18
Groundnut cake	5	5.55	5	3.8
Blood Meal	6.4	7	6.75	7
Brewer Dried Grains	3	2.5	2	2
Bone	2.5	2.5	2.5	2.5
Oyster Shell	1.5	1.5	1.5	1.5
Lysine	0.15	0.15	0.15	0.15
Methionine	0.2	0.10	0.05	0
Salt	0.3	0.3	0.3	0.3
Broiler Premix	0.25	0.25	0.25	0.25
Total	100	100	100	100
<b>Calculated Analyses</b>				
CP, %	21.91	22.03	21.94	22.00
ME, Kcal/Kg	2900.9	2917.30	2915.66	2920.71
EE, %	4.30	4.78	5.06	5.50
CF, %	3.66	3.67	3.74	3.84
Calcium, %	1.38	1.37	1.37	1.37
Av. Phosphorus, %	0.50	0.5	0.5	0.50
Lysine, %	1.27	1.25	1.23	1.23
Methionine, %	0.47	0.44	0.46	0.48

D1: Contains 0.2 %methionine and 0% SBS, D2: Contains 0.15%methionine and 2% SBS, D3: Contains 0.05%methionine and 4% SBS, D4: Contains 0%methionine and 6% SBS, SBM: Soya bean meal, SBS: Sandbox Seeds, CP: Crude protein, ME: Metabolizable Energy, EE: Ether extract, CF: Crude fibre, Av. Pho.: Available phosphorus

## RESULTS AND DISCUSSION

There were no significant differences ( $P>0.05$ ) among the SBS-supplemented dietary treatments in their effects on feed intake (total feed intake and daily feed intake). Also, treatment D1 (0.2% DL-methionine+0% SBS) was not significantly ( $P>0.05$ ) different from treatment D2 (0.1% DL-methionine+2% SBS) in its effect on feed intake but significantly ( $P<0.05$ ) different from treatments D3 (0.05% DL-Methionine +6% SBS) and D4 (0%DL-Mmethionine +6% SBS). The non-significant difference in feed intake among the SBS-supplemented diets in this study could be attributed to the low crude fibre level of the SBS which is 6.06%, and fibre is known to depress feed intake as it creates fullness to the GIT (Nsa *et al.*, 2010). According to Archibong *et al.* (2023), SBS also contains saponin which is known to reduce feed intake. However, the feed intake in this study was not affected and this could imply that the saponin level of 2.2mg/100g in SBS (Fowomola and Akindahunsi, 2007) is at tolerable amount and has not impaired feed intake. Values of daily feed intake obtained in this study (80.56-104.70g/bird) are similar to 88.98-92.13g/bird obtained by Dabai *et al.* (2021) but higher than 123.32-136.25g/bird obtained by Rabo *et al.* (2021).

The treatments were not significantly different in their effects on final weight, weight gain and FCR of the birds in the present study. Methionine is known to initiate protein synthesis. Its availability or otherwise will determine the effectiveness of this activity. The similarity in the values of weight gain and final weight in this study can be attributed to the fact that methionine from SBS is as available as the DL-methionine. According to Mortiz *et al.* (2005), methionine deficiency can result in retarded growth. Similar trend was observed for the feed conversion ratio as there was no significant difference among the treatments in their effects on FCR. Treatment D4 (0% DL-methionine + 6%SBS) has a numerically best FCR among the treatments. This implies that the organic source of methionine can serve as sole source of methionine in broiler production.

**Table 2: Growth Performance of Finisher Broiler Chickens Fed Diets with Graded Levels of Decorticated Raw Sandbox Seeds (*Hura crepitans*)**

Parameters	Treatments				SEM	P-value
	D1	D2	D3	D4		
Initial Weight (g)	643.33	665.19	648.89	606.67	17.53	0.75
Total Feed Intake (g)	2931.68 <sup>a</sup>	2546.30 <sup>a,b</sup>	2255.56 <sup>b</sup>	2273.21 <sup>b</sup>	108.39	0.62
Daily Feed Intake (g/b/d)	104.70 <sup>a</sup>	90.94 <sup>a,b</sup>	80.56 <sup>b</sup>	81.19 <sup>b</sup>	3.87	0.62
Final Weight (g)	1949.33	1932.00	1958.67	1986.67	59.60	0.99
Weight Gain (g)	1306.00	1266.81	1309.78	1380.00	52.56	0.92
Daily Weight Gain (g/b/d)	46.64	45.24	46.78	49.29	1.88	0.92
FCR	2.25	2.11	1.74	1.68	0.13	0.35

a, b: Means in the same row with different superscripts are significantly different (P<0.05)

D1: Control with 0.2 %DL-methionine and 0% SBS, D2: Contains 0.10% DL-methionine and 2% SBS, D3: Contains 0.05% DL-methionine and 4% SBS, D4: Contains 0% DL-methionine and 6% SBS, g= Gram, g/b/d= Gram per bird per day, SEM: Standard Error of Mean, FCR: Feed Conversion Ratio

## CONCLUSION

It can be concluded that SBS at 6% inclusion level has no detrimental effect to finisher broiler production. It can also effectively serve as alternative source of methionine in broiler production.

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