

REPLACEMENT VALUE OF SESAME SEED MEAL (*Sesamum Indicum*) FOR SOYBEAN MEAL ON PERFORMANCE OF STARTER BROILERS

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Abstract

One hundred (100) Anak strain day-old broiler chicks were used to evaluate the replacement value of Sesame Seed Meal (SSM) (*Sesamum indicum*) for soybean meal (SBM) on growth response of broilers starter. Chicks were randomly allotted to four treatment groups consisting of five replicates of five chicks per replicate in a completely randomized design. The dietary treatments were sesame seed meal (SSM) replaced for soybean meal at 0, 5, 10 and 15% w/w in T₁ (control), T₂, T₃, and T₄ diets respectively. For four weeks, data were collected on feed intake, weight gain, feed to gain ratio and mortality. Results revealed that all the parameters were similar ($P < 0.05$) across the dietary treatments except feed to gain ratio which was significantly ($P < 0.05$) better in T₂ (5% SSM replacement) (1.60) compared to control T₁ (0% SSM replacement) (1.61) respectively. It can be concluded that sesame seed meal (SSM) has a potential to replace at least 5% soybean meal (SBM) without any negative effect

Key words: Replacement value, growth response, feed to gain ratio, potential, mortality.

Introduction

Nigeria still remains among the least animal protein consumers in Africa. For instance, the average animal protein intake for Africa is 11g/head/day while the average value for Nigeria is 7.5g/head/day. This has been attributed to high and rising cost of some feedstocks which are not always accessible to rural farmers' accounts for 60 – 75% cost of raising commercial poultry (Adedoyin, 2014). Similarly, with the insufficient production of soybean meal (SBM) in Nigeria has led to permission being given for an import of this product from other countries such as Brazil, Austria etc. However, today the price is considerably still high due to government policy which also on the other hand has to encourage soybean growers in Nigeria. Searching for alternative vegetable protein sources, which are cheap and locally available, has become increasingly urgent subject to poultry nutritionists in the country. One of the vegetable plant sources that can replace soybean is sesame seed. Sesame (*Sesamum indicum-L*) seed is a drought, tolerant crop adapted to many soil types (Rahimian *et al.*, 2013). Sesame meal is the by-product of oil extraction from sesame seed. It has a crude protein content of about 46% and medium energy value (Olomu, 2011). Full fat sesame seed and the meal after oil extraction are not only excellent sources of edible nutrients (45 to 50% lipid, 15 to 20% protein, and 10 to 15% carbohydrate and 47.1 to 52.9% crude protein respectively (Deyab *et al.*, 2007). The amino acid composition of the protein is similar to that of soybean meal with the exception of lower lysine and higher methionine in sesame. The fiber content of the seed ranges from 2.7 to 6.7% (Ralf and Knoietzny, 2016). Sesame seeds are also good sources of minerals and vitamins such as manganese, copper, calcium, vitamin B₁ and Vitame E and in addition to the highly absorbable spectrum of vitamin E, they increase its bioactivity in the body (Yakubu and Alfred, 2014) Many studies have showed sesame seed meal replacement of soybean meal at 25 – 75% in broilers diet. Therefore the objective of this preliminary study is to evaluate the replacement value of sesame meal for soybean meal based diets for broilers starter.

Materials and Methods

100 day old unsexed Anak strain broiler chicks were randomly allotted into four treatments groups in a completely randomized design. Each treatment group was replicated five times with five birds per replicate. Sesame seed meal purchased from Maya market in Ibarapa Area, Oyo State was dried and then grounded separately to a fine powder and replaced with soybean meal at 0, 5, 10, and 15% w/w

in treatments 1 (control), 2, 3 and 4 respectively (Table 2). Body weight and feed intakes were determined weekly while feed to gain ratio was estimated as outlined by Olomu (2011). The birds were fed the experimental diets and clean drinking water ad libitum for a period of 4 weeks. Mortality ratio were also calculated as percentage of total number of birds per group. All data collected were subjected to analysis of variance technique (SAS 2007). Means of significant result was compared by Duncan's. Proximate analysis of the sesame seed were analyzed according to the procedures described by AOAC (1990).

Table 1: Proximate Composition of Sesame Seed Meal and Soybean Meal

Nutrient%	Soybean	Sesame
Moisture	6.89	6.11
Crude protein	46.66	43.10
Crude fiber	6.11	9.03
Either extract	18.38	23.49
Ash	5.02	4.87
Nitrogen free extract	14.99	10.83

Table 2: Gross Composition of Experimental Starter Diets

Ingredients	T ₁	Replacement levels of sesame seed meal (SSM)		
		T ₂ (5%SSM)	T ₃ (10%SSM)	T ₄ (15%SSM)
Maize	56.0	56.0	56.0	56.0
Soybean meal	39.0	34.0	29.0	24.0
Sesame meal	-	5.0	10.0	15.0
Bone meal	2.90	2.90	2.90	2.90
Oyster shell	1.10	1.10	1.10	1.10
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
Common salt	0.30	0.30	0.30	0.30
Premix	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00

Calculated composition

Crude protein (%)	23.08	22.89	22.69	22.58
Crude fibre (%)	3.08	3.66	3.73	3.98
Metabolizable energy (Kcal/kg)	2981.76	3006.4	3089.3	3100.1

Table 3: Growth Response of Broiler Chicks fed Sesame Seed Meal (SSM) and Soybean Meal (SBM) based diets

Parameters	T ₁ (0%)	T ₂ (5%)	T ₃ (10)	T ₄ (15%)	SEM
Initial body weight (g/bird)	39.86	39.98	39.79	39.88	1.8
Final body weight (g/bird)	842.83 _b	870.8 ^a	839.44 ^{bc}	840.01 ^b	2.8
Daily weight gain (g/bird)	30.10 ^{ab}	31.11 ^a	29.98 ^{bc}	30.0 ^{ab}	1.2
Daily feed intake (g/bird)	48.63 ^{ab}	49.93 ^{ab}	50.63 ^a	51.11 ^a	2.6
Feed to gain ratio	1.61 ^c	1.60 ^{bc}	1.68 ^{ab}	1.70 ^a	0.19
Mortality(%)	4	4	4	4	00.1

abc...indicate in the same row with different subscripts are significant ($P < 0.05$) different.

SEM = Standard Error of Mean

Results and Discussion

The nutrients composition of the test diets indicated an optimum crude protein value of approximately 23% as suggested by Olomu (2011). The growth performance of the starter broilers fed sesame seed meal (SSM) and soybean meal (SBM) based diets are presented in Table 3. At the starter phase, the results show that all parameters were similar ($P > 0.05$) across the dietary treatments. However, numerical higher values of 870.8, 31.1 and 1.60 respectively were recorded for final body weight, daily weight gain and feed to gain ratio of birds fed T₂ (5% SSM) replacement of soybean meal. Also, there was a decrease in average final body weight and daily weight gain with increased level of sesame seed meal in the diets T₃ (10% SSM replacement) and T₄ (15% SSM replacement). This results is in agreement with the reports of Agbulu et al (2010) and Diarra and Usman (2008) that reported slight decrease in weight gain of broilers fed high graded levels of soaked sesame seed meal as a source of methionine in broiler chickens. This could be attributed to the presence of phytic and oxalic acid content of sesame seed meal and its subsequent inhibiting the nutrients utilization in the diet. Hossain and Jauncey (1998) suggested that the high phytic acid content of SSM is a possible reason for its lower apparent protein digestibility. Also, it was stated that being a lignanin plant which may interferes the absorption of minerals and vitamins in the diet and also led to poor feed to gain ratio observed as the level of sesame meal increased. Although, birds fed T₂ (5% SSM replacement) diet had better fed to gain ratio compared with the control. It agrees with Olomu (2011) that sesame

seed meal which has a higher content of methionine than most plant protein supplement when used in the right proportion together with soybean meal which also has a higher content of lysine, will result in balanced diet of lysine and methionine, which might play a crucial role in digestion as observed in this study.

Conclusion: It can be concluded that sesame seed meal has a potential as a feed resource to replace soybean meal at 5% in broiler diets without any negative effect. Also, its contents phytate and oxalate still possess some limitations to its use as a feed resource.

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