

NUTRITIONAL EVALUATION OF DIFFERENTLY PROCESSED PIPER (*Canavalia plagiosperma*) SEEDMEAL (CPSM) IN STARTER BROILER DIET

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ABSTRACT

A feeding trial was conducted using three differently processed *Canavalia plagiosperma* seeds aimed at improving the nutritive value for starter broiler's ration. The meals were used to formulate seven broiler starter rations at 0 %, 10 % and 20 % dietary levels, respectively. Each of the seven broiler starter rations was fed to a group of 42 one week old broiler chicks for 28 days, to evaluate the performance and economic implications. There were significant differences ($P < 0.05$) in daily feed intake, daily body weight gain and feed conversion ratio. Results from this trial suggests that *Canavalia plagiosperma* seedmeal(CPSM) could be included in broiler starter diets up to 20 % without adverse effect if cracked, soaked in water and boiled for an hour.

Key words: Alkaline, boiled, broiler starter, *Canavalia plagiosperma* seeds, cracked, soaked.

INTRODUCTION

The poultry industry is undergoing a turbulent period (Okorie, 2006), some farmers have closed down and others have been forced to reduce their production capacity due to high cost of feed and feedstuffs (Esonu *et al.*, 2001). The major reason for this scarcity and increased cost of poultry feed has been attributed to increased competition between man and livestock for major feedstuffs (Okorie, 2006). The high cost and irregular supply of the conventional feed sources have stimulated researches into unconventional feed materials that are biologically qualitative (Akpodiete, 2008) locally available, less expensive and non-edible to man (Ekenyem *et al.*, 2008) such as *Canavalia plagiosperma* seeds. *Canavalia plagiosperma* is a high forage and high seed yielding tropical legume with high energy and high protein content and quality (Odoemelam, 2007).

MATERIALS AND METHODS

Sources and processing of the test materials

Canavalia plagiosperma seeds for the research were obtained from Ikwuano Umuahia in Abia State of Nigeria. The seeds were processed through the following methods: 1. (cracked, soaked in water and boiled for 1 hour (CSWB1), 2. (cracked, soaked in water and boiled for 2 hour (CSWB2) and 3. (cracked, soaked in alkaline and boiled for 1 hour (CSAB1), respectively. Samples of the raw, CSWB1, CSWB2 and CSAB1 seed meals respectively were analyzed, using standard methods (AOAC 1990) to determine the nutrients composition.

Experimental diets

Seven (7) experimental broiler starter diets were formulated such that the differently processed

Canavalia plagiosperma seed meals were included at 0%, 10% and 20% dietary levels respectively as shown on Table 1. Feed and water were offered *ad libitum* to the birds during the trial. Feed materials were bought from Fidelity Feed Industries, Owerri.

Experimental birds and design

Two hundred and ninety-four (294) one-week-old Marshal Strain broiler chicks were used which were divided into seven groups of 42 birds each. The 42 birds were further subdivided into three replicates of 14 birds each and randomly assigned to the seven treatment diets in a completely randomized design (CRD).

Data collection

The birds were weighed at the beginning of the trial period and subsequently on weekly basis. Feed intake was determined by obtaining the difference between the quantity of feed offered and quantity left over after 24 hours the next morning. Weight gain was determined by the difference between the initial weight and final weight. Daily weight gain was calculated by dividing the weight gain by the number of days the trial lasted. Feed conversion ratio was computed by dividing the average daily feed intake by the average daily body weight gain. Feed cost per Kg and feed cost per Kg meat produced were also calculated. The trial lasted 28 days.

Statistical analysis

Data collected were subjected to analysis of variance (ANOVA) as outlined by Snedecor and Cochran (1980). Where significant differences were observed between treatments, means were compared using Duncan's New Multiple Range Test (DNMRT) as outlined by Obi (1990).

RESULTS AND DISCUSSIONS

Data on the performance and economic analysis of the starter broiler chicks fed the differently processed CPSM were shown in Tables 2 and 3, respectively. Birds on 10% CSWB1 dietary level of inclusion performed best ($P<0.05$) in term of feed intake and feed conversion ratio. This performance could be attributed to higher protein quality content of the test material due to detoxification of the ANFs in the processing methods. It was observed that the daily weight gain dropped as the level of the test material increased except with the group on 20 % CSWB1. This confirms that anti-nutritional factors reduced growth rate and feed conversion efficiency (Tamir and Alumot, 1996). However, birds on 10% inclusion levels of CPSM performed better ($P<0.05$) than their counterparts on 20% dietary inclusion levels. Based on the trial, the birds on 20 % CSWB1 dietary inclusion level were economically produced (190.48) than the other groups in $\square/\text{Kg}$ meat produced. Birds from the groups on CPSM diets were generally economically produced in term of $\square/\text{Kg}$ meat produced.

Conclusion

This study suggests that the three processing methods could improve the nutritive value of *Canavalia plagioperma* seeds and could be included at 10% dietary level in starter broiler ration. It was critically observed that starter broiler chicks fed on 20%CSWB1 diet performed best ($P<0.05$) being the less expensive diet in the trial.

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Table 1: Composition of broiler starter experimental diets

Ingredients	Inclusion levels of differently processed CPSM						
	0%	CSWB1		CSWB2		CSAB1	
		10%	20%	10%	20%	10%	20%
Maize	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Soybean Meal	30.00	20.00	12.00	20.00	12.00	20.00	12.00
CPSM*	0.00	10.00	20.00	10.00	20.00	10.00	20.00
Fish Meal	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Palm Kernel Cake	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Wheat Offal	10.00	10.00	8.00	10.00	8.00	10.00	8.00
Bone Meal	3.50	3.50	3.50	3.50	3.50	3.50	3.50
TM/Vit. Premix **	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25	0.25	0.25

Salt	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Total	100.0	100.00	100.00	100.0	100.00	100.0	100.00
	0			0			
Calculated chemical composition of the experimental diets							
Crude protein	22.26	21.15	20.58	21.15	20.58	21.15	20.58
Crude fibre	4.52	4.58	5.01	4.58	5.01	4.58	5.01
Ether extract	3.80	3.70	3.83	3.70	3.83	3.70	3.83
Ca	1.48	1.49	1.50	1.49	1.50	1.49	1.50
P	0.95	0.92	0.93	0.92	0.93	0.92	0.93
ME (Kcal/Kg)	2837.02	2912.12	3090.42	2912.1	3090.42	2912.1	3090.42
				2		2	

* CPSM = Processed *Canavalia plagioperma* seedmeal; ** To provide the following per kg of feed: Vit. A, 10,000iu; Vit. D₃, 1,500iu; Vit. K, 2 mg; riboflavin, 3 mg; Pantothenic acid, 6 mg; Niacin, 15 mg; Choline chloride, 3 mg; Vit. B₁₂, 0.08 mg; Folic acid, 4 mg; Mn, 8 mg; Zn, 0.5 mg; Iodine, 1.0 mg; Co 1.2 mg; Cu, 10 mg; Fe, 20 mg; NB:- CSWB1 = Cracked, soaked in water for 48 hrs and boiled for 1 hr; CSWB2 = Cracked, soaked in water for 48 hrs and boiled for 2 hrs; CSAB1 = Cracked, soaked in alkaline solution for 48 hrs and boiled for 1 hr

Table 2: Performance of starter broilers fed different levels of *Canavalia plagioperma* seedmeals (CPSM)
Inclusion levels of differently processed CPSM

Parameter	CSWB1		CSWB2		CSAB1		SEM
	0%	10%	20%	10%	20%	10%	20%
Initial body weight (g)	141.50	150.00	145.83	154.17	154.12	150.00	154.50
Final body weight (g)	1030.56	1116.67	1170.83	1152.67	966.62	1116.67	933.33
Body weight gain (g)	889.06 ^b	966.67 ^{ab}	1025.00 ^a	998.50 ^a	812.50 ^b	966.67 ^{ab}	778.83 ^b
Daily body weight gain (g)	31.75 ^b	34.52 ^{ab}	36.61 ^a	35.66 ^a	29.02 ^c	34.52 ^{ab}	27.82 ^c
Daily feed intake (g)	83.18 ^c	85.17 ^{bc}	95.44 ^a	88.52 ^b	83.90 ^c	88.31 ^b	81.81 ^c
Feed conversion ratio	2.62 ^b	2.47 ^c	2.61 ^b	2.48 ^c	2.89 ^a	2.56 ^b	2.94 ^a
Mortality	-	-	-	-	-	-	-

^{abc} means within rows with different superscripts are significantly ($P < 0.05$) different. SEM – Standard Error of the Mean.

Table 3: Economic analysis of different dietary inclusion levels of processed CPSM

Parameter	Inclusion levels of differently processed CPSM						
	CSWB1		CSWB2		CSAB1		
	0%	10%	20%	10%	20%	10%	20%
Feed cost (N/Kg)	95.78	81.78	72.98	81.78	72.98	81.78	72.98
Feed cost savings (%)	-	14.62	23.81	14.62	23.81	14.62	23.81
Feed cost (N/Kg) meat produced	250.94	202.00	190.48	202.81	210.91	209.36	214.56

CPSM = *Canavalia plagioperma* seedmeal