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CARCASS EVALUATION OF BROILERS FED ON DECORTICATED FERMENTED *PROSOPIS AFRICANA* G. SEED MEAL

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The study was conducted to determine the carcass characteristics of broiler birds fed on prosopis seed meal. Two hundred and forty day-old Anak 2000 broiler chicks were used for the trial. Five experimental diets containing 0, 25, 50, 75 and 100% DFPSM were fed to broilers for 8 weeks. The experiments were in a completely randomized design (CRD) with five treatments, each replicated four times with 48 birds per treatment and 12 birds per replication.The parameters measured were live weight, plucked and dressed weight and internal organs. The average live weight of broilers ranged from 2.50 to 2.85 kg in each dietary group and were significantly ($P<0.05$) affected by dietary treatment, the dressing percent and the carcass weight were similar across the dietary treatments ($P<0.05$) also the percent of cut- up part, internal organ weights were not affected by the dietary treatment ($P>0.05$) except lungs and kidney that were significantly affected ($P<0.05$). The result indicated that DFPSM could completely (100%) replace soyabean in the diet of birds with out depression of performance and carcass yield.

Key words: prosopis*;* decortication; fermentation; carcass; broiler

ЕВАЛУАЦИЈА НА ТРУПОТ НА БРОЈЛЕРИ ХРАНЕТИ СО ОБРОК ОД ИЗЛУПЕНО И ФЕРМЕНТИРАНО СЕМЕ ОД *PROSOPIS AFRICANA* G.

Истражувањето беше спроведено со цел да се утврдат карактеристиките на труповите на бројлери хранети со оброк од семето на просопис. За опитот беа користени бројлерски пилиња од хибридот Анак 2000, со старост од 240 дена. Бројлерите беа хранети 8 недели со 5 вида храна која содржеше 0, 25, 50, 75 и 100% семе на просопис Експериментите беа целосно рандомизирани (CRD) со пет третмани, при што секој се повтори четири пати со 48 птици по третман и 12 птици по повторување. Беа следени следните параметри: жива маса, обезперјен и обработен труп, како и внатрешните органи. Просечната жива маса на бројлерите се движеше од 2,50 до 2,85 kg за секоја различно хранета група и беше значително под влијание на третманот ($P<0.05$). Обработениот труп и масата на трупот беа слични во склопот на третманот ($p <0,05$). Процентот на отсечените делови и масата на внатрешните органи не беа под влијание на видот на храната ($P>0.05$), освен белите дробови и бубрезите, кои беа под значајно влијание ($P <0.05$). Резултатот покажа дека обработеното семе од просопис може целосно (100%) да го замени соиното зрно во исхраната на птиците, без да се нарушат перформансите и уделот на трупот.

Клучни зборови: просопис; лупење; ферментација; бројлерски труп

INTRODUCTION

The widened gap between the production and consumption of animal protein and per capital animal protein intake in the face of rapid human population growth especially in developing countries has already been creating adverse consequences on the global food security (Ukachukwu and Obioha, 2000). The past two decades have witness of progressive increase in the cost of soyabean and ground nut cake which was attributed to declining production and increasing demand by rapidly expanding human population (Okeodo et al., 2005) for direct human consumption and therefore has a phenomenal effect in the critical inputs supply chain of the animal feed industry whose major cost item, especially the poultry production enterprise is feed.

In spite of the high cost and competitive supply trend of soya bean and groundnut, these oil seeds still remain the traditional ingredient supplying plant protein in poultry feeds, consequently, the cost of producing poultry continues to be on the increase (Amaefule and Iroanya, 2004). Global focus on the search for alternative replacement of these oilseeds for the animal feed industry remains a viable solution to the high incidence of hunger and malnutrition manifesting in most poor and developing countries associated with low per capital protein intake. These alternative replacements should however be nutritionally and economically viable and importantly less preferred for direct human feeding thereby reducing competition between the animal feed industry and others (Amaefule and Iroanya, 2004).

It is in the light of this that prosopis seed is being considered as a potential replacement of the major oil seeds. Decorticated prosopis seed is reported to have 42.52% crude protein, 7.93% ether extract, 4.93% crude fibre and 8.12% ash nutritional values (Yusuf et al., 2008). The disadvantages of prosopis is the high content of anti-nutritive factors such as tannins, haemagglutinins, prosopine and toxic amino acids which are capable of inducing adverse effect on monogastric animals when consumed without adequate processing (Cheeke and Shull, 1985).

This study was aimed at evaluating the potentials of improving the nutritional values of the decorticated prosopis seed through fermentation of carcass characteristics of broilers.

MATERIALS AND METHODS

***Prosopis seed collection and processing*:** Prosopis seeds were obtained from Lafia market, Nigeria. The cleaned seeds were boiled for three hours and allowed to cool to room temperature. The processing involved decortication which was done by hand squeezing the seeds and washed with clean water.

The wet decorticated seeds were then ensiled in a large polythene sacks and fermented for two days according to the method described by Achi (1992). The fermented seeds were then sun-dried to a constant weight and milled using hammer mill to produce prosopis seed meal. The chemical composition of the decorticated fermented prosopis sample was analyzed according to the A.O.A.C (2000) method. This forms the basis of experimental feeds formulation.

***Experimental treatment*:** Two hundred and forty day old un-sexed Anak 2000 broiler chicks were used for the experiment. The birds were randomly divided into five (5) experimental groups of three replications each designated as T (control), T1, T2, T3 and T5 representing 0, 25, 50, 75 and 100% replacement of soya beans with decorticated fermented prosopis seed meal (DFPSM) at both starter and finisher phases.

All experimental birds were given feed and water *ad libitum,* feed intake was recorded daily and the birds were weighed weekly while routine management and vaccination were uniformly undertaken during the (8) eight weeks feeding trial.

***Carcass characteristics and organ determination*:** Forty five birds (2 from each replication) were randomly selected from each of the treatment groups deprived of feed but not water for twelve hours, slaughtered and eviscerated for organ weight determinations as described by Fasuyi (2005).

Statistics: The data collected were subjected to analysis of variance (ANOVA), correlation and means were separated where there were significant differences using the Duncan's Multiple Range Test using SPSS 16.0.

RESULTS AND DISCUSSION

The proximate composition of decorticated fermented prosopis seed meal (DFPSM) is shown in Table 1 while the nutrient composition of the experimental diets is shown in Table 2. Data on carcass characteristics and internal organs of broiler chickens on the various dietary levels of DFPSM are respectively presented in Table 3 and Table 4. The raw prosopis seed contained 22.62% CP, 6.46% EE, 6.90% CF and 4.04% ash, while the decorticated fermented prosopis seed meal contained 42.52% CP, 7.93% EE, 4.93% CF and 8.12% ash, while the major mineral contents are calcium, phosphorus and potassium.

The nutrient compositions of the experimental diets, and the calculated crude protein for the treatment diets ranged from 20.00 to 20.04%, the calculated metabolisable energy ranged from 2807.23 to 2903.00 kcal/kg (Table 2). Carcass weight was similar in different dietary treatments ($P>0.05$) as was the case with the internal organ weight, except the lung and kidney that were significantly ($P<0.05$) affected by the dietary treatments.

Table 1

Proximate composition of raw and fermented prosopis seed meal (%DM)

Nutrients	Percentage (%) Raw	Fermentation
Dry matter (DM)	96.08	94.25
Crude protein	22.62	42.52
Ether extract	6.46	7.93
Ash	4.04	8.12
Crud fibre	6.90	4.93
Mineral		
Phosphorus	0.69	0.86
Calcium	1.21	1.13
Potassium	0.68	0.79

Table 2

Percentage composition and calculated analysis of experimental diets

Ingredients	0	25	50	75	100
Maize	54.70	56.00	54.00	53.40	52.40
Full-fat soyabeans	31.10	23.30	16.10	10.00	0.00
Prosopis seed meal	0.00	6.50	15.70	22.40	33.40
Maize offal	10.00	10.00	10.00	10.00	10.00
Bone meal	2.50	2.50	2.50	2.50	2.50
Oyster shell	1.00	1.00	1.00	1.00	1.00
Salt	0.25	0.25	0.25	0.25	0.25
**Premix	1.00	1.00	1.00	1.00	1.00
Methianine	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10	0.10
Total	100	100.00	100.00	100.00	100.00
Calculated analysis					
Crude protein %	20.00	20.00	20.00	20.00	20.00
Crude fibre %	4.60	4.50	4.50	4.40	4.10
Ether extract %	4.10	4.20	4.50	4.60	4.80
Calcium %	1.40	1.40	1.30	1.30	1.30
Phosphorus %	0.80	0.70	0.70	0.70	0.60
ME (kcal/kg)	2807.21	2878.68	2860.60	2888.60	2903.20

** Premix 2.5 kg contains. Vit A 15,000000 iu, Vit D3 300000 iu, Vit E 30000 iu, Vit K 2500 iu, Thiamine B 2000 mg, Riboflovin (B2) mg, Pyridoxine (B6) 4000 mg, Niacine 40000 mg, Vit B12 20 mg, Pantothemic acid 10000 mg, Forlic acid 1000 mg, Biotin 80 mg, Choline chloride 500 mg, Antioxidant 125 g, Manganese 96 g, Zinc 60 g, Iron 24 g, Copper 6 g.

Table 3

Cut up parts proportion of Broiler Birds fed on Different Experimental Diet % level of inclusion

Parameter	0	25	50	75	100	SEM
Final live weight (kg)	2.85^{a}	2.80^{ab}	2.55^{c}	2.57^{bc}	2.50^{c}	0.9*
Dressing percentage	74.16	76.31	70.84	72.95	74.10	1.93^{NS}
Eviscerated weight (kg)	2.13	2.13	1.81	1.88	1.88	0.10^{NS}
Drumstick	4.24	4.37	4.11	4.19	4.48	0.3^{NS}
Back	15.61	15.45	17.53	18.52	17.16	0.86^{NS}
Breast	25.76	26.38	28.15	30.59	26.52	1.57^{NS}
Wing	4.29	4.23	28.15	3.87	4.06	0.35^{NS}
Neck	5.38	5.12	4.77	5.84	5.60	0.32^{NS}
Shank	3.50	3.10	6.07	3.94	4.04	0.29^{NS}
Thigh	6.31	6.41	4.12	5.71	5.74	0.46^{NS}
Head	2.23	2.34	5.76	2.61	2.59	0.11^{NS}

NS = Not significant; SEM = Standard error of mean

Table 4

Internal organ proportion of broiler birds fed different experimental diet % level of inclusion

Parameter	0	25	50	75	100	SEM
Heart	0.25	0.71	0.41	0.43	0.43	0.19^{NS}
Gizzard	4.02	4.13	4.53	3.91	4.10	0.35^{NS}
Liver	2.18	2.19	2.32	2.45	2.38	0.08^{NS}
Intestine	6.74	6.27	7.29	7.02	8.38	0.47^{NS}
Lung	0.56	0.81	0.71	0.58	0.82	0.06*
Spleen	0.17	0.17	0.18	0.20	0.15	0.04^{NS}
Kidney	0.13	0.15	0.14	0.11	0.11	0.005*
Gall-bladder	0.10	0.10	0.60	0.28	0.50	0.06^{NS}
Abdominal fat	2.51	2.63	2.73	2.46	2.54	0.13^{NS}

NS = Not significant; SEM = Standard error of mean; *($P<0.05$)

The determined nutrients content of the raw and processed prosopis meal obtained in this trial was at variance with the finding given by Annongu and Ter Meulen 2001; Jurgen et al., 1998. Various factors ranging from the processing method, length of fermentation and the activity of micro-organism could be responsible for the high increase in the nutrient composition. This was in agreement with the finding given by Yusuf et al., 2009.

The relative weight of cut up parts and internal organs weight of broilers for treatment groups are shown in Table 3 and Table 4.

The DFPSM supplemented groups had greater ($P<0.05$) breast percentage compared with the control group. However, the dressing percentage and the carcass percentage, did not show significant differences between the control group and the DFPSM-supplemented groups ($P>0.05$).

The means of relative weight of organs to the BW are shown in Table 4. The giblets, liver, abdominal fat and gizzard percentage did not show significant differences between the control group and the DFPSM supplemented groups ($P>0.05$).

CONCLUSION

The result of this study which lasted for eight weeks indicates that inclusion of decorticated fermented Prosopis seed meal at 25, 50, 75 and 100% did not affect most of the parameters measured, therefore DFPSM could replace soyabean meal in boiler production without any depression on performance and carcass yield.

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