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Growth Performance of Different Broiler Strains Fed *Mimosa diplotricha* Leaf Meal

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Abstract
One hundred and twenty (120) Arbor acre, Cobbs and Ross broilers strains were used to determine the effect of *Mimosa diplotricha* leaf meal (MDLM) on the growth performance of the different commercial broiler birds. The different strains were randomly assigned to three treatment groups, with 40 birds per group and replicated thrice with 10 birds per replicate and 10 birds as control, in a completely randomized block design (CRBD). Two experimental diets were prepared and used in feeding the birds during the starter and finisher phases of chicks rearing and contained each case either zero MDLM as control or 2% MDLM as treatment feed. The data on feed intake, weight gain, and feed conversion ratio was collected during the starter and finisher phases of feeding. The result obtained revealed that there was significant difference ($p<0.05$) among the treatments for all growth parameters measured. The breed Arbor acre strain recorded better performance than other breeds for all the growth parameters measured at both starter and finisher phases. Hence the breed Arbor acre is recommended when feeding broilers with feed containing 2% Mimosa *diplotricha* leaf meal

Keywords: *Mimosa diplotricha,* leaf meal, broiler strains, feed

Introduction

The feed crises facing poultry industry in Nigeria strongly indicate the need to adopt locally available non-conventional feed resources in commercial feeding of chickens. Therefore the use of local, cheap and readily available feed materials particularly those that do not serve as human food has received particular attention as major alternatives to the use of conventional feedstuffs (Nwakpu *et al.,* 2000; Ekenyem, 2006; Akande *et al.,* 2007). Alternative protein sources have received particular attention because conventional protein sources such as soybean, fishmeal and groundnut among others have become very expensive, due to their high demand in food industry.

One of the possible sources of cheap protein is the leaf meal of some tropical legumes and browse plants (Esonu *et al.,* 2003). Many of these leguminous browses have high leaf biomass yield rates and are adapted to tropical environments, hence common in farmlands, compound bushes and roadsides (Okoli *et al.,* 2003). A typical example is the *Mimosa diplotricha* which is regarded as a weed and commonly found in most farmlands at different ecological zones of Nigeria. Earlier studies by Nworgu (2004) recommended only 2% *Mimosa diplotricha* and *Pueraria phaseoloides* leaf meals for broiler chicken for optimal growth. However there is the need to establish commercial breed effects on the growth performance of broilers fed such levels *Pueraria phaseoloides* leaf meals during the starter and finisher phases.

This paper reports the growth performance of Cobbs, Ross and Arbor acre strains of commercial broilers fed *Mimosa diplotricha* leaf meal in their diets.

Materials and Methods

The study was carried out at the poultry farm of Animal Science and Technology Teaching and Research Farm, Nnamdi Azikiwe University Awka, Anambra state. One hundred and twenty (120) day- old broilers of Abor acre strain (40), Cobbs strain (40) and Ross strain (40), were procured for the experiment. The chicks were brooded for seven days for acclimatization during which they were fed the control broiler starter diet and thereafter assigned to three treatments namely; T1 (Arbor acre strain), T2 (Cobbs strain), and T3 (Ross strain), each replicated three times in a completely randomized block design (CRBD).

Fresh mimosa leaves were harvested in Nnamdi Azikiwe University campus during the months of January to March and sundried for about 3 days, the leaf proper separated from the stalks and stored in sacs as *Mimosa diplotricha* leaf meal (MDLM). The proximate composition of the MDLM is shown in table 1. Two experimental diets were prepared and used in feeding the birds during the starter and finisher phases of chicks rearing. Two different diets were formulated for each phases, one containing zero MDLM as control feed and the other containing 2% MDLM as treatment feed. The ingredient composition of the starter and finisher diets are

shown in the tables 1. The birds were *fed ad libitum* for six weeks during three weeks of starter and finisher phases.

Data were collected on feed intake (weight of feed consumed each day), weight gain (the difference between initial weight and final weight of birds) feed conversion ratio (FCR, the ratio of feed consumption to weight gain) and mortality rate. The data collected were subjected to analysis of variance (ANOVA) using GENSTAT 7.2 edition statistical software package. Differences between treatment means were separated using least significance difference (LSD) at 5% probability level.

Table 1: Proximate composition of *Mimosa diplotricha* (Source: Ezeabara and Mbah 2016)

Fraction	Composition (%)
Carbohydrate	38.05
Ash	2.98
Crude protein	16.76
Moisture content	5.97
Crude fibre	2.18
Fat	13.18

Table 2: Composition of broiler starter and finisher diets

	Starter Diet		Finisher Diet	
Ingredient	(0% MDLM)	(2% MDLM)	(0% MDLM)	(2% MDLM)
Maize	50.00	50.00	60.00	60.00
Soybean	30.00	30.00	20.00	20.00
Fish meal	2.00	2.00	2.00	2.00
Mimosa diplotricha leaf	0.00	2.00	0.00	2.00
Wheat offal	8.00	6.00	8.00	6.00
Palm kernel cake	4.00	4.00	4.00	4.00
Blood meal	2.00	2.00	2.00	2.00
Bone meal	3.00	3.00	3.00	3.00
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Tm/v premix	0.25	0.25	0.25	0.25
Calculated Analysis				
Crude protein	22.46	22.48	18.95	18.97

Results and Discussion

The table 3 shows that overall, there were significant differences ($p<0.05$) between the control and treatment birds for all parameters measure both at starter and finisher phases in agreement with the reports of Iheukwumere *et al.* (2008) and Akhouri *et al.* (2013) that supplementation of broilers feeds with leaf meals has significant effects on growth performance indices. Nworgu (2004) however reported that 2% MDLM inclusion in broiler diet led to increased feed intake and subsequent increase in body weight gain in broilers.

Table 3: Effects of MDLM inclusion on growth performance of finisher and starter broilers

Parameters	Starter Phase Inclusion Levels			Finisher Phase Inclusion Levels		
	0%	2%	$LSD_{0.05}$	0%	2%	$LSD_{0.05}$
FI	5046.667	4495.667	456.17	7620.667	7461.333	191.0
FCR	1.58	1.70	0.007	0.87	0.97	0.007
BWG	3178.000	2644.333	326.73	8721.000	7655.667	441.5

Table 4 shows that there were no significant differences ($p>0.05$) in the feed intake and body weight gain across broiler strains during at starter phase, while, there were significant differences ($p>0.05$) in the feed

conversion ratio values, with Arbor acre recording better FCR values than others. At the finisher phase however, the three strain recorded significantly different ($p<0.05$) growth performance values, with Arbor acre strain recording the highest feed intake value, while Cobbs strain recorded the highest body weight gain and better feed conversion ratio values. The difference in body weight gain for the three different strains could be attributed to the genetic makeup of the strains. This result agrees with the reports of Youssef *et al.* (2015) that different broiler strains fed similar diets may record varied performance results. Udeh and Ogbu (2011) however, observed no significant difference in the body weight gain of Arbor acre, Ross and Anak broiler strains.

The table 5 shows that at the starter phase, there was no significant ($p>0.05$) feed intake and inclusion levels interaction between strains, while there were significant differences in the body weight gain and feed conversion ratio ($p<0.05$). At the finisher phase, there were also significant ($p<0.05$) in the interactions differences between strain and inclusion level for the growth parameters measured.

Table 4: Effects of MDLM inclusion on growth performance of different strains of broilers

	Starter phase				Finisher phase			
	Arbo Acre	Cobbs	Ross	$LSD_{0.05}$	Arbo acre	Cobbs	Ross	$LSD_{0.05}$
FI	4689.667	4754.00	4869.67	Ns	7719.33	7350.00	7534.00	233.9
FCR	1.53	1.73	1.66	0.009	0.88	0.84	1.07	0.009
BWG	3066.667	2744.33	2922.33	Ns	8756.67	8766.67	7043.33	540.8

Table 5: Strain x Inclusion levels interaction on the growth parameters of the broilers at starter and finisher phases

	Starter Phase				Finisher Phase			
Strains	MDLM (%)	FI	FCR	BWG	MDLM (%)	FI	FCR	BWG
Arbo acre	0	4869.67	1.33	3666.67	0	7572.00	0.75	10033.33
	2	4509.33	1.83	2466.67	2	7867.00	1.05	7476.67
Cobbs	0	5090.00	1.82	2800.00	0	7329.00	0.78	9433.33
	2	4417.67	1.64	2689.00	2	7410.67	0.91	8100.00
Ross	0	5180.00	1.69	3066.67	0	7961.33	1.19	6700.00
	2	4559.33	1.64	2777.67	2	7113.33	0.96	7390.00
$LSD_{0.05}$		Ns	0.0125	514.1		330.833	0.0125	764.7

ns =not significant

For example, Arbo acre recorded a higher body weight gain and a better feed conversion ratio at 0% inclusion than at 2% inclusion, while consuming more feed at the 2% than at 0% inclusion. Cobbs on the other hand, performed better at 0% inclusion than at 2% inclusion for all the growth parameters measured. This results especially those on FCR agree with the findings of Akande *et al.* (2007) and Iheukwumere *et al.* (2008), but disagrees with the work of Nworgu (2004) who reported a higher feed conversion ratio at 2% inclusion. Tesfaye *et al.* (2013) also reported that significant increase in feed conversion ratio with supplemented groups as compared to the control group when *Moringa oleifera* leaf meal was fed. The better feed conversion ratio recorded for 0% inclusion could be as a result of the absence of the leaf meal which contains the anti-nutrient, mimosine.

Conclusion

It was concluded that Arbor acre performed better in all the growth parameters measured. At 2% inclusion level, *Mimosa diplotricha* leaf meal lowered the growth performance of broilers irrespective of the phase of development and strain of broiler fed.

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