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Comparative Performance of Four Breeds of Broiler Chickens Fed a Popular Commercial Diet in Kuta

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Abstract
The aim of this research study was to compare the performance of four breeds of broiler chickens fed a popular commercial Diet in Kuta. One hundred and twenty day old chicks of different breeds, thirty each (Arbor acre, Marshal, Anak, Cobb) were selected and randomly allotted to four treatments with three replicates each in a completely randomized experimental design. Results from the experiment revealed that there were no significant ($p<0.05$) differences among the treatments in terms of water intake feed intake body weight gain and feed conversion efficiency. Anak and Cobb breeds had the highest numerical values for most of the performance indices measured such as average weekly feed intake (1425.60g, 1272.60g), total feed intake (4714.3g, 4509.8g), average weekly water intake (4046.40ml, 4317.00ml), total water intake (12698.7ml, 14527.6ml), average weekly body weight gain (298.51g, 348.13g), and feed conversion ratio (4.87, 3.67). This research study shows that the Cobb breed have superior performance compared to other breeds on the same feed and under same environmental condition in Kuta. This implies that the four mentioned breeds can perform in Kuta but that is more favourable to Cobb breed.

Keyword: Broiler, chicken, Arbor acre, Marshal, Anak, Cobb

Introduction
Poultry refers to all domesticated birds rendering economic service to man. It consist of different birds species such as chicken, turkey, pigeons, ducks and others, with chicken being the most important of all species to human diet (Adegbola, 1989) cited by Abednego *et al*. (2010). Poultry is one of the animals protein sources available to the ever growing Nigerian Population, thus making significant contribution to the human nutrition and economic development Poultry meat and eggs serve as important sources of high quality animal protein in those areas of the world that have protein insufficiency (Abednego *et al.,* 2010). Intensive poultry production was introduced into Nigeria over fifty years ago and has developed rapidly especially in the last few decades as an important livestock enterprise in the country (FAO, 2000). The rapid expansion of the poultry industry is due to the attractive attributes of poultry which include the ability to adapt easily, high economic value, rapid generation time and a high rate of growth that can result in the production of meat within 7 to 8 weeks and first egg within eighteen weeks of the first chick being hatched. Poultry industry contributes more than 75% of the total livestock production in Nigeria (Abednego *et. al.,* 2010).

The aim of this work was to compare the performance of four breeds of broiler chickens fed a popular commercial Diet in Kuta

Materials and Methods
The study was carried at the Teaching and Research Farm of Niger State College of Agriculture Mokwa, Kuta Study Centre. Kuta is characterized by two seasons which are wet (March to October) and dry season (November to March). Kuta lies between latitudes 3^{o} 20' and 7^{o} 41' North of equator and Longitudes 8^{o} and 11^{o} 3' East of the Greenwich. One hundred and twenty broiler chickens of four different breeds were sourced at different commercial hatcheries at Ibadan, Oyo State, Nigeria. The breeds are Arbor Acre, Marshal, Cobb and Anak. The feed was sourced from a commercial feed factory (Sunnah Feed Production Enterprise) along Bosso Road, Bosso local Government Area of Niger State.The experimental design used for this work was completely randomized Design (CRD). One hundred and twenty Broiler chicks comprising the four different breeds (30 each) were sourced from different hatcheries in Ibadan. The birds were allotted to four treatments with each treatment having three replicates

of ten birds each. Treatment 1 – Arbor acre breed, 2 – Marshal Breed, 3 – Cobb breed, and 4 – Anak breed. The experiment was conducted in two phases, the brooding and the finishing phase.
During brooding, Sunnah starter mesh were fed to the birds. Water was given *ad libidum*. Thebirds were vaccinated against Newcastle disease (Gumboro and Lasota) between the first week and fourth week (Starter phase). During the finishing phase, Sunnah Finisher of same company was used. Standard hygiene measures were maintained throughout the experimental period. The experiment lasted for 8 weeks. Data was collected on the following parameters:- *Water Intake* A known quantity of fresh water was given to the birds at the same time as feed. The water intake was obtained by deducting the quantity of left over from the quantity of water offered. *Average feed intake* This was obtained by subtracting the quantity of left over feed from the quantity of the feed that was supplied to the birds per day divided by the number of birds for each replicate.*Average body weight gain*The initial weights of the chicks weretaken at the beginning of the experiment by weighing all the chicks in each replicate and dividing by the number of the birds. Subsequently, the average weekly body weight gain was obtained by subtracting the body weight of the previous week from the weight of the present week. *Feed conversion* ratio**.** This was obtained from the average feed intake per week and the average weight gain per week for each bird**.**

Data collected was subjected to one way analysis of variance (ANOVA) using SPSS (2008) version 16.0. Least significance Difference (LSD) was used to separate the mean (at $p<0.05$).

Results

Table 1 shows the weekly average water intake per bird. There were significant ($p<0.05$) differences starting from week 1 to week 4 with treatment 4 having the highest water intake values of 634.44ml, 1097.83ml, 1461.67ml and 2077.33ml, respectively; at week 5 and 6, there was no significance in the water intake in all the treatments. However, total water intake (TWI) shows a significant ($p<0.05$) difference in all the treatments with treatment 4 having the highest value of 14527.6ml and treatment 1 having the lowest value of 9724.2ml for the total water intake.Table 4.2 shows the weekly average feed intake. There was a significant ($p<0.05$) difference at week 1, 2, 3, 4 and 5 with treatment 3 having the highest value of 333.09g and 937.80g at week 1 and 5, respectively. There was no significant difference in all the treatments at week 6 though treatment 3 had the highest value. Total feed intake (TFI)showed no significant difference in all the treatments.Table 4.3 shows the result of the average weekly body weight gain per bird. The table shows a significant ($p<0.05$) difference at week 2, 3, 5 and 6 with treatment 4 having the highest values of 121.33g, 162.67g, 363.49g and 348.13g at week 1, 2, 5 and 6 respectively. Weeks 1 and 4 showed no significant difference. There was a significant ($p<0.05$) difference in Total body weight gain (TBWG) among all the treatments with treatment 4 having the highest value of 1631.6g and treatment 1 having the least value of 1238.9g.Table 4.4 shows the result of average weekly feed conversion ratio of four different breeds of broiler chickens. The table shows a significant ($p<0.05$) difference among the treatments in weeks 2, 3 and 6. Also, there was no significant difference in all treatments in weeks 1, 4 and 5. There was also significant ($p<0.05$) difference in total feed conversion ratio with T4 having the best value of 2.70.

Table 1: Average weekly water intake per bird (ml) of four different breeds of broiler chicken

Weeks	Treatments					
	T 1	T 2	T3	T4	SEM	LOS
1	336.43^{d}	406.84^{c}	473.63^{b}	634.44^{a}	18.55	*
2	700.55^{c}	728.15^{c}	865.89^{b}	1097.83^{a}	31.03	*
3	1236.75^{c}	1335.96^{ab}	1496.63^{a}	1461.67^{ab}	36.41	*
4	1602.67^{c}	1846.74^{b}	1858.93^{a}	2077.33^{a}	52.79	*
5	2382.00	3163.70	3290.50	3372.80	332.73	NS
6	3465.80	4036.80	4046.40	4317.00	419.99	NS
TWI	9724.2^{c}	11548.3^{b}	12698.7^{b}	14527.6^{a}	558.22	*

Mean of the same superscript are not significantly different ($P<0.05$), mean of the different superscript are significantly different.(*): Significant NS: not significant T1: Arbor acre T2: Marshall T3: Anak T4: Cobb TWI: Total Water Intake SEM: Standard error of Mean LOS: Level of Significance

Table 2. Average weekly feed intake per bird (g) of four different breeds of broiler chicken

Weeks	Treatments					
	T 1	T 2	T3	T4	SEM	LOS
1	257.85^{b}	287.96^{a}	333.09^{a}	330.00^{a}	16.55	*
2	443.72^{c}	510.20^{b}	576.77^{a}	585.00^{a}	15.32	*
3	442.25^{c}	496.75^{b}	556.24^{a}	570.83^{a}	8.76	*
4	545.25^{b}	576.20^{b}	682.15^{a}	653.20^{a}	18.13	*
5	653.20^{b}	784.80^{ab}	973.80^{a}	831.10^{ab}	80.68	*
6	1134.90	1213.60	1425.60	1272.60	110.88	NS
TFI	4492.2	4436.0	4714.3	4509.8	47.89	NS

Table 3: Average weekly body weight gain per bird (g) of four different breeds of broiler chicken

Weeks	Treatments					
	T 1	T 2	T3	T4	SEM	LOS
1	93.33	89.15	118.20	121.33	10.98	NS
2	104.00^{b}	102.91^{b}	87.70^{b}	162.67^{a}	17.43	*
3	224.17^{b}	265.65^{ab}	306.98^{a}	210.00^{b}	23.04	*
4	250.00	265.71	339.68	305.00	50.56	NS
5	341.11^{a}	330.72^{a}	341.13^{a}	363.49^{a}	15.40	*
6	278.81^{a}	218.08^{c}	298.51^{b}	348.13^{a}	14.47	*
TBWG	1238.9^{c}	1244.7^{c}	1461.1^{b}	1631.6^{a}	50.30	*

Table 4: Average weekly feed conversion ratio of four different breeds of broiler chicken

Weeks	Treatments					
	T 1	T 2	T3	T4	SEM	LOS
1	2.78	3.41	2.82	2.72	0.21	NS
2	4.23^{ab}	5.67^{ab}	7.50^{a}	3.60^{b}	1.16	*
3	1.98^{b}	1.89^{b}	1.85^{b}	2.82^{a}	0.26	*
4	2.17	2.20	2.33	2.50	0.36	NS
5	1.93	2.40	2.93	2.30	0.31	NS
6	4.10^{ab}	5.67^{a}	4.87^{ab}	3.67^{b}	0.57	*
TFCR	3.61^{c}	3.58^{c}	3.23^{b}	2.70^{a}	0.11	*

Discussion

The research result (table 1) show that the Cobb breeds had the highest value for water intake which means that Cobb breed regulates body temperature better than the other breeds used in the study. This may be attributed to their genetic factor which make the breed adopt better to the environmental condition which is in agreement with the findings of Boyles (2003), who stated in his work that poultry production involves the use of large amount of water; limitation to water intake depress animal performance drastically more than any nutrient deficiency. The Cobb breeds had highest value for body gain (1631.6) and the best feed conversion ratio (2.70) which suggest that Cobb breed responds to Sunnah feed better than other breeds under Kuta weather condition. Cobb breed utilizes the feeds it consumed more efficiently than the other breeds used though it consumed less feed than the Anak breed. This may be due to the genetic makeup of the Cobb breed which serves as an advantage over other breeds which make them adapt faster to Kuta environmental control than other breed used in the study. This is in agreement with the findings of Abednego *et al*. (2010). Also, Egena (2009) stated that broiler chickens fed with quality feed at different growing stages and supplied water *ad-libitum* maximizes growth. The Cobb breeds had the best feed conversion ratio over the other breeds used in the study. This findings is agreement with the result obtained by Lacy and Vast (1999) who studied that the lower the feed conversion efficiency the more efficient the animal. This is most likely due to the breed type and adaptability to the environmental condition of Kuta.

Conclusion

Result obtained from this study show that Cobb breed have good performance over the Arbor acre, Marshall and Anak breeds with good feed efficiency, highest water intake, fast growth rate and lesser feed consumption than the Anak breed; the Arbor acre breed had slowest growth, low feed conversion efficiency and less feed and water intake which may be due to genetic factor and adaptability to the environment.In conclusion, this experiment has shown that Cobb breed under good management could possibly be better for production in Minna with minimum cost of production for its low feed intake and fast growth rate.

Recommendation

One of the major challenges faced during the course of this experiment was the incidence of mortality due to disease outbreak at the experimental site. We will like to recommend that rearing of these breeds should be done with serious precaution against disease outbreak. We also recommend that further research should be carried out on more breeds and same research can be carried out in other geopolitical zones of Niger state. For farmers in Kuta, we recommend Cobb breed for production in Kuta area since the breed is more economical in terms of good feed utilization, high water intake and fast growth rate.

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