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STATISTICAL ANALYSIS OF THE EFFECT OF FEEDS ON AVERAGE BODY WEIGHT GAIN OF SOME BIRDS

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Abstract: This paper considered the effects of a newly composed diet on the body weight gain of broilers. The weight gains of broilers after four weeks of administration of feeds to different levels were recorded. The result shows that the diets has the same effect on the broilers when Coco-pod was administered as compared to when maize was administered, we therefore concluded that Coco-pod has a significant effect on the weight gain.

Keywords: Broiler, Coco – Pod, Starter, Finisher

1.0 Introduction

Poultry production business has been known as one of the promising businesses in most countries of the world in terms of turnover and production. Poultry occupies a unique position in livestock production in Nigeria. The expansion of this Industry depends on a larger extent on the availability of good quality feeds. Poultry animals are needed to balance our daily protein intake requirements as it is reported worldwide because, they are balanced food in terms of its protein and carbohydrate content. Broilers are birds produced via genetic (Engineering) manipulation of chicken to yield table meat within a short period of time. In temperate regions,Broiler take between 0 – 8 weeks to reach the market while in the tropics (Nigeria) it takes 0 – 10 weeks. Apart fromits dietary requirements which is its major use, they are also useful in some other areas such as found in the manufacturing of Vaccines and drugs. Poultry manure is also used in fertilizer production as well as for ornament purpose while the droppings of geese are used in the manufacturing of pillows. Poultry productioncan be grouped into two or three classes.It involves rearing of birds for ultimate production of eggs or meat. It also include incubation of eggs for production of chicks. Poultry production ventures include:

Table egg production(Raising layers), among the domestic birds, chicken is the most popular, it has achieved this pride of place due to its superior economic importance occasioned by the eggs. Domestic birds are reared for meat, only chickens produce eggs.Hatch table egg production; production of hatch able egg one fertile egg laid by hens that are raised together with cocks such egg, through very edible are expensive to produce and are therefore not meant for table.

Hatchery operation; production of day – old chickens done normally in the hatchery. It is also a sophisticated business because it requires expensive machines (incubators and others) and skill manpower. Started chicken production; started chickened are birds that have been started i.e. raised for a period of time after hatching before they are sold out.

The main processing venture is the processing of poultry products i.e. meat, eggs and fowl. Bird's meat is commonly sold live in some countries. Lives birds are not found in the groceries which are presented in the processed form at cold store.

SERVICES: The following services can be provided in the poultry product industry

MARKETING: This is essential buying and selling of poultry products and by products

CONSULTANCY: Poultry management consultancy by qualified practicing animal scientists

Bessel (1988) reported accessibility of information on poultry production as a major constraint to development. In 1989 the formation of the African network for poultry development (ANRPD) was proposal in African of Ile-Ife, Nigeria and this proposal was endorsed in 1990 in a seminar on small holder poultry production in Thessaloniki Greece. The formation of the network which was has technical and financial backing from FAO, was a major milestone in poultry development in African one of the production of a new shelter as a medium for dissemination of information and development in poultry periodicals publish academic and scholarly articles and some publish trade information for target group, the (ANRDP).

2.0 Materials and Methods

The RCBD model is proposed in this work for our data of broiler production and we used SPSS 20.0 for its execution.

The RCBD model adopted in this work is a model of the form

$$Y_{ij} = \mu + \tau_i + \beta_j + \varepsilon_{ij} \quad (2.1)$$

Whereμ = overall mean

τ_i = effect of the i^{th} treatment

β_j = effect of the j^{th} block

ε_{ij} = a random error term assumed to be normally distributed.

The RCBD design in this work has four treatments administered to three blocks replicated three times.

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2.1 ASSUMPTION OF ANOVA

- Independence of error: We assume that each trial is independent of all other trials
- Homoscedasticity: it is assumed that all error terms have the same variance σ^2
- Normality of error: this assumptions says that in the ANOVA model, the error terms are normally distributed with zero mean.

2.2 PARTIONING OF SUM OF SQUARES

$$SS\ Block = \sum {Y_{.j}}^2 - \frac{{Y_{..}}^2}{N}, \quad t = 1,2, \dots, b$$

$$SS\ Treatment = \sum {Y_{i.}}^2 - \frac{{Y_{..}}^2}{N}, \quad j = 1,2, \dots, b$$

$$SS\ Total = \sum {Y_{ij}}^2 - \frac{{Y_{..}}^2}{N}$$

$$SS\ Error = SS\ Total - SS\ Treatment - SS\ Block$$

$$Note: N = tb$$

2.3 ANALYSIS OF VARIANCE FOR RCBD

This is an arithmetic device used for partitioning the total sum of squares into various components in which each may be attributed to different source of variation in the data.

ANOVA TABLE

Source of Variation	Degree of Freedom	SS	MSS	F- ratio
Treatment (Diet)	$t-1$	$SStr$	$SStr/(t-1)$	$MStr/MSE$
Block (Pens)	$b-1$	$SSbl$	$SStr/(b-1)$	$MSbl/MSE$
Error	$(t-1)(b-1)$	SSE	$SSE/(t-1)(b-1)$	
Total	$tb-1$	SST		

2.4 HYPOTHESIS

Two hypotheses are adopted to be tested in this work are one for the treatment and the other for the block:

Hypothesis one

H_0: The diet have the same effect on the weight of the broilers i.e

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$$H_0: \tau_1 = \tau_2 = \tau_3 = \tau_4$$

H_1: There is different effect on the weight of broilers for at least one of the diet i.e. $H_1: \tau_1 \; are \; not \; equal.$

Decision Rule:

$H_0$is rejected if $F = \frac{MST}{MSE} = F_{calculated} > F_{tabulated} = F_{\propto}(\vartheta_1, \vartheta_2)$ at $\propto$ level of significance for $\vartheta_1$and ϑ_2 degrees of freedom for the numerator and denominator respectively.

Hypothesis two

$H_0: \beta_1 = \beta_2 = \beta_3$

$H_1: \beta_i^{'} s \; are \; not \; equal$

Decision Rule

We reject H_0 if $F = \frac{MSBl}{MSE} = F_{calculated} > F_{tabulated} = F_{\propto}(\vartheta_1, \vartheta_2)$at $\propto$ level of significance for $\vartheta_1$and ϑ_2 degrees of freedom for the numerator and denominator respectively.

3.0 DATA AND DATA ANALYSIS

The data consist of average weekly body weight gain of broilers chick given different levels of dietary supplements, namely coco pod to replace maize which added in percentage 10%, 20%, 30% and the control diet. The diets are the treatments. The broilers were randomized in 12 different pens (called the blocks). Each pen contains 8 broilers chick of both sex. The pen was selected at random and grouped into four.

The first group was given the control DIET I (TREATMENT 1) and the second group DIET II (TREATMENT 2) which was having 10% content of coco – pod, while the third group was also given DIET III(TREATMENT 3) with 20% of coco – pod and the forth group was given DIET IV (TREATMENT 4) with 30% coco –pod.The initial weight of the chicks as at day one varied between 100 to 200gms body weight.

The average body gain weight per week for the broiler chicks increases as the age increases. At the end of the starter feed (four –week), it was observed that the treatments (diets) given to these birds have the same effect on their body weight gain. Their weight gain ranged between 940gm and 1100gm.

The average weekly body weight gain of broilers given four levels of diets at weeks are presented in succeeding tables as follows:

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TABLE 3.1 DATA OF FEED ADMINISTRATION AND WEIGHT GAIN FOR WEEK 1

BLOCKS TREATMENTS

WEEK/WG	**Control diet**	**0.10**	**0.20**	**0.30**	**Sum of block**
PEN 1	2.25	2.18	2.13	2.03	8.59
PEN 2	2.10	2.75	2.13	1.90	8.88
PEN 3	2.18	2.28	2.08	2.10	8.64
Sum of treatment	**6.53**	**7.21**	**6.34**	**6.03**	**26.11**

ANOVA TABLE 1: ANALYSIS OF VARIANCE OF WEEK 1 DATA

Sources of Variation	Degree of Freedom	SS	MSS	F_{cal}	F_{tab}
Treatment	3	0.2495	0.0834	2.1474	4.76
Block	2	0.0120	0.006	0.1739	5.14
Error	6	0.2068	0.0345		
Total	11	0.4683			

Decision: We accept H_0 for both hypotheses since $F_{cal} < F_{tab}$ which follows that the diet has the same effect on the weight gain of the birds in the second week.

TABLE 3.2. DATA OF FEED ADMINISTRATION AND WEIGHT GAIN FOR WEEK 2

WEEK/WG	**Control diet**	**0.10**	**0.20**	**0.30**	**Sum of block**
PEN 1	6.08	7.28	6.28	5.28	25.62
PEN 2	6.75	7.43	7.43	3.36	27.16
PEN 3	7.53	5.85	5.85	6.60	26.33
Sum of treatment	**20.36**	**20.56**	**18.23**	**2.21**	**79.11**

ANOVA TABLE 2: ANALYSIS OF VARIANCE OF WEEK 2 DATA

Sources of Variation	Degree of Freedom	SS	MSS	F_{cal}	F_{tab}
Treatment	3	1.1265	0.3755	0.7681	4.76
Block	2	0.29970	0.1485	0.3037	5.14
Error	6	2.9331	0.4889		
Total	11	4.3566			

Decision: For both hypotheses, we accept H_0 since $F_{cal} < F_{tab}$ which follows that the diet has the same effect on the weight gain of the birds in the second week.

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3.3 WEEK THREE: AVERAGE BODY WEIGHT GAIN OF BROILERS GIVEN FOUR LEVELS OF FINISHER FEED (DIETS)

WEEK/WG	Control diet	0.10	0.20	0.30	Sum of block
PEN 1	8.20	7.35	8.10	8.00	31.65
PEN 2	7.95	7.10	7.35	7.40	29.80
PEN 3	7.80	6.00	9.20	7.25	30.25
Sum of treatment	**23.95**	**20.45**	**24.45**	**22.65**	**91.70**

ANOVA TABLE 3: ANALYSIS OF VARIANCE FOR WEEK 3 DATA

Sources of Variation	Degree of Freedom	SS	MSS	F_{cal}	F_{tab}
Treatment	3	3.41	1.14	2.53	4.76
Block	2	0.47	0.24	0.53	5.14
Error	6	2.69	0.45		
Total	11	6.57			

Decision:For week three the $F_{cal} < F_{tab}$

TABLE 3.4 DATA OF FEED ADMINISTRATION AND WEIGHT GAIN FOR WEEK 4

WEEK/WG	Control diet	0.10	0.20	0.30	Sum of block
PEN 1	9.95	8.35	9.00	9.50	36.80
PEN 2	8.60	6.45	9.90	9.10	34.05
PEN 3	9.00	7.95	8.95	7.90	33.80
Sum of treatment	**27.55**	**22.75**	**27.85**	**26.50**	**104.65**

ANOVA TABLE 4: ANALYSIS OF VARIANCE OF WEEK 4

Sources of Variation	Degree of Freedom	SS	MSS	F_{cal}	F_{tab}
Treatment	3	5.51	1.84	3.12	4.76
Block	2	1.38	0.69	1.17	5.14
Error	6	3.54	0.59		
Total	11	10.43			

Decision: Since $F_{cal} < F_{tab}$, we therefore accept the null hypotheses.

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TABLE 3.5 DATA OF FEED ADMINISTRATION AND WEIGHT GAIN FOR WEEK 5

WEEK/WG	Control diet	0.10	0.20	0.30	Sum of block
PEN 1	10.90	10.65	10.75	10.10	42.4
PEN 2	9.55	8.30	10.25	10.95	39.05
PEN 3	10.40	10.05	10.05	10.00	40.75
Sum of treatment	**30.85**	**29.00**	**31.3**	**31.05**	**122.2**

ANOVA TABLE 5: ANALYSIS OF VARIANCE OF WEEK 5

Sources of Variation	Degree of Freedom	SS	MSS	F_{cal}	F_{tab}
Treatment	3	1.1050	0.3683	0.6894	4.76
Block	2	1.4063	0.7032	1.3164	5.14
Error	6	3.2054	0.5342		
Total	11	5.71167	0.5197		

Decision:$F_{cal} < F_{tab}$, therefore it shows that the diet has no effect on the weight gain of the broilers and there is no sufficient reason to reject the null hypothesis

TABLE 3.6 DATA OF FEED ADMINISTRATION AND WEIGHT GAIN FOR WEEK 6

WEEK/WG	Control diet	0.10	0.20	0.30	Sum of block
PEN 1	11.75	11.05	11.25	11.00	45.45
PEN 2	11.00	9.80	11.00	10.75	42.55
PEN 3	11.50	11.50	11.65	10.65	45.30
Sum of treatment	**34.25**	**32.25**	**33.90**	**34.40**	**133.30**

ANOVA TABLE 6: ANALYSIS OF VARIANCE OF WEEK 6

Sources of Variation	Degree of Freedom	SS	MSS	F_{cal}	F_{tab}
Treatment	3	0.7909	0.2636	0.3955	4.76
Block	2	1.3330	0.6665	3.6001	5.14
Error	6	1.1103	0.1851		
Total	11	3.2342	0.2940		

Decision: since $F_{cal} < F_{tab}$, therefore it shows that other factors may contribute to their weight gain outside the type of feed administered during the experiment.

5.0 CONCLUSION AND RECOMMENDATION

The result of the analysis carried out showed that the diets have the same effect on the body weight gain of broilers. Coco –pod is a tree by – product which has significant effect on the performance of the birds.Since these diets has the same effect on the body weight gain of broilers. We therefore recommend coco –podin place of maize because it is more economical, cheaper in terms of cost and availability.

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