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EFFECTS OF SESAME SEEDS MEAL SUPPLEMENTATION ON THE PRODUCTION ECONOMY OF BROILER CHICKENS

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Abstract

The experiment was conducted to determine the effects of sesame meal supplementation on the production economy of broiler chickens. The study used a total of one hundred- and fifty-day-old Anak 2000 white strain unsexed broiler chicks which were randomly allocated to five dietary treatments of thirty broiler chicks per treatment and replicated three times with ten birds per replicate in a completely randomized design (CRD). Five experimental diets were formulated with toasted white sesame seeds meal (TWSSM) supplemented methionine at 0%, 4%, 8%, 12% and 16% in diets. The growth performance of the birds at starter phase were not significantly different (P>0.05) across all the treatments. At the finisher phase, the average daily feed intake (ADFI) differs significantly (P<0.001) among the treatment groups, while the average daily weight gain (ADWG) and feed conversion ratio (FCR) were similar. Feed cost (₦431.49/kg gain) was higher in T_5 (16%) TWSS while T_2 (4%) TWSS had the lowest feed cost (₦336. 54/kg gain). Thus, it was concluded that TWSSM could be a potential vegetables protein source for broiler chickens' production and can be included in their diets at 4% as supplement for methionine without having effects on growth performance and equally reduces the cost of production.

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Introduction:-

Inadequate protein consumptions is a nutritional problems facing Nigeria and other developing countries of the world especially those of animal origin. FAO (2002). The rate of population growth in Nigeria required an intensive livestock production for improved meat (protein) supply to the populace in order to meet the FAO requirement and recommendation of 35 g/h/d of animal protein against 3.25 g/h/d per average consumed by Nigerians. Poultry production remains the most viable and promising investment of economic importance due to the ease of production and short generation interval, poultry production is unique as its offers the highest turnover rate and quickest return to investment layout in the livestock enterprises (Sanni and Ogundipe 2005). Poultry is the quickest source of animal protein when compared to ruminants and other monogastric animals (Braenkaetet al., 2002, commonest Cheapest and the best source of animal protein (Ojo, 2002)

Profitable poultry farming mostly depends upon good parents stock, quality chicks and feeds (Islam el at, 2002). Nigeria's poultry industry depends entirely on the importation of parentsstock from foreign countries (NAPRI, 1998). In this regard, (Olumakinde (2010) observed that broiler production is highly profitable, as percentage return on investment is about 50%. In support, (Sanni and Ogundipe 2005) affirmed that returns to investment can be improved by turning out batches in a year depending on the length of the production cycle. Consequently, (Olumakinde (2010) confirmed that, to raise 5,000 broilers, a minimum of N-250 net profit is realizable from a bird, while total profit realizable by cycle is N 1,250,000. This can be done four times in a year and net income of N 5 million is achievable.

The major constraints in poultry production in Nigeria is the high and rising cost of inputs, particularly feeds which accounts for more than 85% of the total cost of producing day old chicks, and medication (Umeh and Udo, 2002). Therefore, analysis of cost- returns structure in poultry production would facilitate appropriate knowledge of costs implications in order to obtain optimum economic benefit from investment into the industry (Sanni and Ogundipe, 2005). The results of the study conducted by Agbuluet al (2010) on the economic analysis of feeding broiler chickens with Sesame seeds indicated that the lowest feeds cost were observed in treatment 1 (control) N 1,088.86 and treatment 2 (N 1,392.67). They further observed that the feeds cost continue to increase in subsequent treatments as the sesame seeds level of inclusion continue to increase. The highest cost being treatment 5 (N 1,894.43) with inclusion level of Sesame seeds of 12%, they attributed the high cost of production incurred was by the levels of sesame seeds to periods the seeds were purchased, to this end, they concluded that the feeds cost in Naira per kilogram gain was better in the control diet where synthetic methionine was used than the diets where sesame seeds were used. However, they suggested that the use of Sesame seeds for methionine at treatment 2, with 3% level of Sesame seeds inclusion could be advantageous and economical to the farmers who are distant from the cities where they could not get the synthetic methionine and also when the synthetic methionine is said to be scarce or not available.

Material and Methods:-

Study Area

The study was conducted at the Poultry Research Farm of the Department of Animal Science and Range Management, ModibboAdarna University of Technology, Yola, Girei Local Government Area, Adamawa State, located within the Guinea Savannah Zone and lies between latitude 9° and 11° North of the equator and longitude 11° and 14° East of the Greenwich meridian. It shares its boundary with Taraba state in the South and West.GombeState in its North-West and Borno State to the North. Adamawa state has an international boundary with Cameron Republic along the Eastern border (Adebayo, 1999). The state is characterized by tropical climate marked by dry and rainy season. The rainy season usually commences in April and ends up in October. The dry season then starts in late October and ends in April, annual rainfall is about 700mm-1600mm with an average minimum temperature of 18°C and maximum temperature of 40°C.

Preparation and processing of sesame seeds.

White sesame seeds were used for the study, obtained from Girei market in Adamawa state, North-Eastern Nigeria. The seeds were screened, winnowed and cleaned to remove dirt, sand or stones and other foreign particles. Using fire woods as a source of heat, 5Kg of Sesame seeds were placed in an open wide aluminium pan and toasted for about 15 minutes, continuously stirring with an aluminium spoon to prevent burning of the seeds coat and enhance even distribution of heat, toasting was arrested when the pop sound produced by the seeds as a result of heat was calm and the seeds slightly turned brown, the toasted seeds were then made to cool under a shade for three hours, after which they were ground using mechanical grinder for subsequent inclusion into the treatmenta diets.

Experimental birds and management

The study was conducted using a total of one hundred and fifty (150) day old (Anak, 2000) white strain unsexed broiler chicks, obtained fromObasanjo's Farm in Ota, Ogun state. The birds were managed on a deep litter system throughout the period of the experiment. Brooding of the chicks was done at the first one week of the experiment, during which they were fed on vital feed commercial broiler starter feed. Subsequently, formulated diets and clean drinking water were offered ad libitum. All the necessary routine and occasional management, vaccinations and medication was administered to the birds as recommended by Oluyemi and Roberts (2000).

Experimental design and treatment

The experiment lasted for eight weeks and was designed in a completely randomized design (CRD), a week after brooding, the chicks were weighed and randomly allocated to five (5) dietary treatments of thirty broiler chicks per treatment and replicated three times with ten birds per replicate, each of the treatments groups, except for treatmentone (control) were assigned to formulated diets of toasted white sesame seeds at supplementation levels for methionine at 0%, 4%, 8%, 12% and 16% representing Tl, T2, T3, T4 and T5respectively for both starter and finisher diets, are showned in tables 1 and 2.

Data collection

During the study, data were collected on the growth performance which includes; feed intake, body weight gain, feed conversion ratio and mortality as described by Sirios (1995)

Body weight gain measurement

At the end of the brooding period which lasted for seven days, the experimental birds were weighed to determined their initial weight and then weekly to determine their weight gain. Weekly weight gain was obtained at the end of every week of the experiment by measuring the weight of the birds, and the difference between the recent weight and the initial weight gives the weekly weight gain. On each weighing, strict adherence was made to the report of Das (1994) who opined that birds should be weighed on the same day of each week at approximately the same time of the day. The values obtained were used to determine the average daily weight gain at the end of every phase of the experiment which lasted for 28 days in each replicate using the relation:

$$\text{ADWG} = \frac{\text{final live weight} - \text{initail weight (g/bird)}}{\text{number of birds x 28 days}}$$

Table 1:- Composition of Broilers Starter Diets (1-4 weeks) at 23% CP Level.

Supplementation level of toasted white sesame seeds for methionine					
Ingredients (%)	T_1(0%)	T_2(4%)	T_3(8%)	T_4(12%)	T_5(16%)
Maize (White)	47.80	45.49	42.75	40.36	38.69
Groundnut Cake	39.10	37.41	35.75	34.14	32.33
Maize Offal	10	10	10	10	10
TWSS	0	4	8	12	16
Methionine	0.20	0.00	0.00	0.00	0.00
Bone Meal	2.5	2.5	2.5	2.5	2.5
*Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0..10	0.10	0.10
Common Salt	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Analysis					
ME (Kcal/Kg)	2877.19	2956.53	3019.34	3095.42	3191.15
Crude Protein (%)	23.00	23.00	22.97	23.00	23.00
Crude Fibre (%)	3.54	3.88	4.21	4.54	4.89
Calcium	0.99	1.03	1.06	1.10	1.14
Phosphorus	0.81	0.83	0.83	0.84	0.86
Methionine	0.47	0.30	0.31	0.31	0.34

ME (Kcal/Kg) = 37 x Protein (%) + 81.8 x EE (%) + 35.5 x NFE (%)

*Vitamin-Mineral premix (Bio-mix) provides per Kg the following: Vitamin A500iu; Vitamin D3, 888,000iu; Vitamin E, 12,000mg; Vitamin K3, 15,000mg; Vitamin B1 l00mg; B2, 2000mg; Vitamin B6, 1500mg; Niacin, 1200mg; Pantothenic acid, 2000mg; Biotin, l000mg; Vitamin B12, 3000mg; Folic acid, 1500mg; Choline Chloride; 60,000mg, Manganese, 10,000mg Iron, 1500mg; Zinc, 800mg; Copper, 400mg; Iodine, 80mg; Cobalt 40mg; Selenium, 8000mg.

Table 2:- Composition of Broilers Finisher Diets (4-8 weeks) at 20% CP Level.

Supplementation level of toasted white sesame seeds for methionine					
Ingredients (%)	T_1(0%)	T_2(4%)	T_3(8%)	T_4(12%)	T_5(16%)
Maize (White)	56.13	53.82	51.54	49.31	46.93
Groundnut Cake	30.77	29.08	27.36	25.69	24.07

Maize Offal	10	10	10	10	10
TWSS	0	4	8	12_	16
Methionine	0.20	0.00	0.00	0.00	0.00
Bone Meal	2.5	2.5	2.5	2.5	2.5
*Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10	0.10
Common Salt	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Analysis					
ME (Kcal/Kg)	2954.86	3031.66	3108.74	3188.80	3264.97
Crude Protein (%)	20.00	20.00	19.98	20.00	20.00
Crude Fibre (%)	4.62	3,74	4.07	4.41	4.73
Calcium	0.97	1.01	1.05	1.09	1.12
Phosphorus	0.78	0.80	0.81	0.82	0.84
Methionine	0.46	0.27	0.30	0.30	0.32

ME (Kcal/Kg) = 37 x Protein (%) + 81.8 x EE (%) + 35.5 x NFE (%)*Vitamin-Mineral premix (Bio-mix) provides per Kg the following: Vitamin A500iu; Vitamin D3, 888,000iu; Vitamin E, 12,000mg; Vitamin K3j 15,000tng; Vitamin B1 l000mg; B2, 2000mg; Vitamin B6, 1500mg; Niacin, 1200mg; Pantothenic acid, 2000mg; Biotin, l000mg; Vitamin BJ2, 3000mg; Folic acid, 1500mg; Choline Chloride; 60,000mg, Manganese, 10,000mg Iron, 1500mg; Zinc, 800mg; Copper, 400mg; Iodine, 80mg; Cobalt 40mg; Selenium, 8000mg.

Feed intake

A known quantity of feeds was offered to each group of the experimental birds twice every day between 7-8am in the morning and 3-4pm in the afternoon. The quantity of feeds consumed by bird/day replicate was determined as the difference between weight of the refused and the quantity offered. This was done throughout the period of the experiment for both starter and finisher phase.

$$\text{feed intake} = \frac{\text{Quantity offeredoffered} - \text{refusal (g/bird/day)}}{\text{number of birds X 28days}}$$

Feed conversion ratio (FCR).

The feeds conversion ratio of the experimental birds was measured as an index of feeds utilization for each treatment group i.e. feeds intake per unit rate of weight gain, in other words, feeds conversion ratio (FCR) was calculated as the ratio of feeds intake to weight gain as follows:

$$\text{FCR} = \frac{\text{feed intake (g)}}{\text{Weight gain (g)}}$$

Mortality

Mortality was recorded as it occurred during the eight weeks of the experiment, in each of the phase of the experiment, the percentage mortality was obtained;

$$\text{Mortality} = \frac{\text{number of dead birds}}{\text{total number of birds}}$$

Economics of production

The economic analysis of producing birds for the period of the experiment using toasted white Sesame seeds (TWSS) as supplementation for synthetic methionine at varying levels was assessed and determined. The total quantity of feed consumed by birds in each treatment and the cost of all other feed ingredients per kilogram (Kg) used in the formulation of experimental diets were recorded and values used to determine the economics of production, with special consideration on the cost of diet/Kg, total cost of feeds intake N/Kg, cost of weight gain N/Kg.

Chemical analysis

Proximate analysis of the experimental diets (starter and finisher) and toasted white Sesame seeds (TWSS) were carried out to determine the dry matter (DM) content, crude protein (CP), crude fibre (CF), ether extract (EE) and total ash content, using the procedure outlined by AAC (1990), The nitrogen free extract (NFE) was calculated using the values obtained from the proximate composition and metabolisable energy (ME) calculated according to the procedure of Pauzenga(1985).Quantitative determination of anti-nutritional factors; phytates, oxalates, tannin and saponin were done by the procedure described by Maga (1983), Fasset (1996). Dawra (1982) and Brunner (1984) respectively.

Statistical analysis

All the datas generated from the experiment were subjected to one way analysis of variance (ANOVA) in a completely randomized design (CRD) according to Steel and Torrie (1980). Treatment means were separated using Duncan's Multiple Range Test (DMRT) (Duncan, 1995).

Results:-

Table 3:- Proximate Composition of Toasted White Sesame Seed Meal (TWSSM).

Nutrient	Percentage
Crude Protein (CP)	20.26
Ether Extract (EE)	53.27
Ash	4.37
Crude Fibre (CF)	9.38
Nitrogen Free Extract (NFE)	6.38
Moisture	6.34
Dry matter	93.66
Organic matter	89.29

Proximate composition of toasted white sesame seeds (TWSS)

The result of the proximate composition of toasted white sesame seeds meal (TWSSM) ispresented in Table 3. It therefore indicated 20.26%, 53.27%, 4.37%, 9.38% and 6.38% for Crude Protein (CP), Ether Extract (EE), ash, crude-fibre and Nitrogen Free Extract (NFE) respectively. Others include moisture, 6.34%; Dry matter, 93.66% and organic matter, 89.29%.

Table 4:- Amino acids profile and anti-nutritional factors in toasted white sesame seeds meal (TWSSM).

Amino acids	Concentration
Arginine	8.93
Glycine	7.31
Histidine	3.02
Isoleucine	3.92
Leucine	10.37
Lysine	6.24
Methionine	3.23
Phenylalanine	7.81
Proline	3.20
Serine	5.48
Threoline	4.25
Valine	3.27
Anti-nutritional factors	Concentration (g/l00 g sample)
Phytates	0-47
Oxalates	0-12
Saponins	ND
Tannins	ND

ND = Not Detected

Ammo acids profile and anti-nutritional factors in toasted white sesame seeds meal (TWSSM)

Table 4 presented the results of the amino acids profile and anti-nutritional factors in toasted white sesame meal (TWSSM). It revealed the concentration of each of the amino acids analyzed in g/l00g protein as follows: Arginine, 8.93; Glycine, 7.31; histidine, 3.02; Isoleucine, 3.92; Leucine, 10.37; Lysine, 6.24; Methionine, 3.23; Phenylalanine, 7.81; Proline, 3.20; Serine, 5.48; Threonine, 4.25 and Valine, 3.27.However, the concentration in g/l00g of the anti-nutritional factors in the sample ingredient indicated that phytate and oxalate had 0.47g/100g and 0.12g/100g respectively; while Saponins and Tannins were not detected in the samples ingredients (TWSSM).

Table 5:- Proximate Composition of the Experimental Broilers Starter and Finisher Diets.

Treatments	Starter dietPercentagesof TWSSFinisher Diets									
NC	$T_1$0%	T_2 4%	T_3 8%	T_4 12%	T_5 16%	$T_1$0%	$T_2$4%	$T_3$8%	$T_4$12%	T_5 16%
Moisture	3.52	3.21	5.48	5.52	3.52	5.26	5.62	5.39	5.39	3.57
DM	96.48	96.79	94.52	94.48	96.48	94.74	92.38	94.61	90.68	96.43
CP	23.56	23.16	23.88	23.69	23.79	20.13	20.68	20.16	20.48	20.64
CF	10.14	11.24	11.23	11.36	11.68	10.24	10.76	10.86	11.17	11.36
EE	5.24	5.76	8.53	5.83	5.92	9.51	8.58	5.96	9.75	7.56
Ash	6.46	3.58	4.06	3.39	6.51	6.53	8.04	6.82	7.53	8.08
NFE	51.18	53.05	46.82	50.21	48.58	48.31	48.32	50.81	45.68	48.79
ME	3109.06	3211.36	3243.42	3135.88	3089.08	3237.73	3182.36	3037.20	3176.95	3114.13

(Kcal/Kg) 37 x CP (%) + 81.8 x EE (%) + 35.5 x NFE (%) (Pauzenga, 1985)

NC=Nutrients composition. DM=Dry matter. CP=Crude protein. CF=Crude fibre.EE=Ether extract. Nitrogen free extract.ME=Metabolizable energy TWSS = Toasted White Sesame Seed

Proximate composition of the experimental broilers starter and finisher diets

The analyzed results for the proximate composition of the experimental broiler starter and finisher diets are presented in Table.5. The established proximate values for the crude protein (CP) for the experimental starter diets was found to be 23.56%, 23.16%, 23.69%, 23.79% forTl, T2, T3, T4 and T5 respectively, with the value range of 23,16-23.88%. Similarly, the crude protein (CP) values obtained for the experimental finisher diets ranged from 20.13-20.68% with20.13%, 20.68%, 20.16%, 20.48% and 20.64% Tl, T2, T3, T4 and T5respectively. The nutrient composition of the experimental diets for crude fibre (CF) ranged was 10.14-11.68% and 10.24-11.36% for both the starter and finisher diets. However, the composition of the diets in terms of crude fibre for the treatment groups indicated 10, 14% and 10.24%, 11.24% and 10.76%, 11.23% and 10.86%, 11.36% and 11.17%, 11.68% and 11.36% for Tl, T2, T3, T4 and T5of the two phases of the feeding trial. Ether extract (EE) ranged between 5.14 and 8.53% for starter diets and 6.58 to 9.51% for finisher diets respectively. Thus, Tl, T2, T3, T4 and T5values for the ether extract revealed 5.14%, 5.76%, 8.53%, 5.83% and 5.92% for the starter diets while 9.51%, 6.58%, 5.96%, 5.76% and 7.56% were the corresponding values recorded for the finisher diets for ether extract. The ash content obtained for both the starter and finisher experimental diets ranged from 3.39-6.51% and 6.53-8.08% for the various treatment groups, the ash content was found to be 6.46%, 3.58%, 4.06%, 3.39%, 6.51% and 6.53%, 8.04%, 6.82%, 7.53%, 8.08% for Tl, T2, T3, T4 and T5as values recorded for both the experimental starter and finisher diets. The composition of the Nitrogen Free Extract (NFE) ranged between 46.32 and 53.05% for the starter diets, while the finisher diets had the values ranged between 45.68 and 50.81%. Specifically, the starter diets had 51.18%, 53.05%, 46.82%, 50.21% and 48.53% while the corresponding values obtained for the experimental finisher diets are 48.31%, 48.32%, 50.81% and 45.68% and 48.79% for Tl, T2, T3, T4 and T5Consequently, the metabolizable energy (ME) which was obtained in each treatments diets using the method of Pauzenga (1985), ranged from 3089.08-3243.42Kcal/Kg and 3037.20-3237.73Kcal/Kg in starter and finisher diets respectively.

Table 6:- Effect of Supplementation Levels of TWSS for Methionine on the Performance of Broilers (1-4 weeks) Starter Phase.

Supplementation Level of TWSS for Methionine						
Parameters	T_1 (0%)	T_2 (4%)	T_3 (8%)	T_4 (12%)	T_5(16%)	SEM
Initial Weight (g)	95.66	99.33	99.66	100.00	97.66	4.53^{NS}
Final Weight (g)	636.25	565.83	562.13	576.43	602.73	18.89^{NS}
Daily Feed Intake (g)	52.08	47.72	53.14	50.05	50.17	1.65^{NS}
Average Daily Weight Gain (g)	19.30	16.66	17.70	17.01	18.04	0.66^{NS}
Feed Conversion Ratio	2.69	2.86	3.00	2.95	2.78	0.09^{NS}
Mortality (number)	1	-	1		2	-

SEM = Standard Error of Means

NS - Not Significant

Table 7:- Effect of Supplementation Levels of TWSS for Methionine on the Performance of Broilers (4-8 Weeks) Finisher Phase.

Supplementation Level of TWSS for Methionine						
Parameters	T_1 (0%)	T_2 (4%)	T_3 (8%)	T_4 (12%)	T_5 (16%)	SEM
Initial Weight (g)	636.25	565.83	562.13	576.43	602.73	18.89^{NS}
Final Weight (g)	1652.08	1520.41	1583.10	1467.26	1398.81	$7L55^{NS}$
Daily Feed Intake (g)	100.77^{a}	97.40^{a}	94.26^{ab}	84.93^{bc}	83.64°	3.02***
Average Daily Weight Gain (g)	36.27	34.09	35.28	31.87	28.43	2.03^{NS}
Feed Conversion Ratio	2.78	2.86	2.69	2.68	2.81	0.11^{NS}
Mortality (number)	-	-	-	1	-	-

a, b, c = Means within the same raw bearing different superscripts differ significantly (PO.05)
*** = Significant (P<0.001)
NS = Not Significant
SEM = Standard Error of Means

Table 8:- Effect of supplementation levels of TWSS for methionine on the pooled performance of broilers (1-8 weeks).

Supplementation Level of TWSS for Methionine						
Parameters	T_1 0%)	T_2 (4%)	T_3 (8%)	T_4 (12%)	T_5 (16%)	SEM
Initial Weight (g)	95.66	99.33	99.66	100.00	97.66	4.53^{NS}
Final Weight (g)	1144.17	1043.12	1089.28	1021.84	1000.77	44.16^{NS}
Daily Feed Intake (g)	76.43^{a}	72.56^{bc}	73.70^{ab}	67.40^{bc}	66.91^{c}	1.96*
ADWG (g)	27.76	25.38	26.49	24.44	23.23	128^{NS}
Feed Conversion Ratio	2.74	2.87	2.85	2.82	2.80	0.10^{NS}

KEY; VDWG=Average Daily Weight Gain
a, b, c = Means within the same raw bearing different superscripts differ significantly (P<0.05)
* = Significant (P0.05)
NS = Not Significant
SEM = Standard Error of Means

Growth performance

Average daily feed intake (ADFI)

The average daily feeds intake for the starter, finisher and when pooled are presented in Tables, 6, 7 and 8 respectively. At the starter phase, the average daily feeds intake was not significant (P>0.05) across all the dietary treatments. The highest average daily feeds intake (53.14g/bird) was recorded on birds fed T3 (8%) TWSS while birds fed T2 (4%) TWSS recorded the least feeds intake (47.72g/bird). However, the values of the average feeds intake obtained for Tl, T2, T3, T4 and T5during the starter phase were 52.08g5 47.72g, 53.14g, 50.05g, and 50.17g respectively. At the finisher phase, the values obtained for the average daily feeds intake range from 83.64g in T5 to 100.77g/bird in Tl. The highest daily feeds intake (100.77g/bird) was recorded in Tl (0%), while T5 (16%) recorded the least daily feeds intake (83.64g/bird). When the performance of the birds were pooled in terms of the daily feeds intake there was no significant difference (P<0.05) between all the treatment diets. Tl (0%) recorded the highest daily feeds intake (76.43g/bird) while T5 (16%) had the least daily feed intake (66.91g/bird).

Average daily weight gain (ADWG)

The performance of broiler chickens in terms of the average daily weight gain for the starter, finisher phases and when pooled are presented in Tables 6, 7 and 8. At the starter phase of the broilers growth, the initial weight (g/bird) which did not differ (P>0.05) in all the treatment groups were found to be 95.66, 99.33, 99.66, 100.00 and 97.66g/bird for Tl, T2, T3, T4 and T5respectively. Similarly, the final weight of birds at same phase which also had no significant difference (P>0.05) among the treatment groups, recorded 636.25, 565.83, 562.43 and 602.73g/bird and for Tl, T2, T3, T4 and T5 respectively.The final weights were 1652.08, 1520.41, 1583.10, 1467.26 and 1398.81g/bird for Tl, T2, T3, T4 and T5 respectively, there was also no significant (P>0.05) difference in the treatment groups.

When the initial weight of the birds for the phases of their growth were pooled, the results were; 365.96, 332.58, 347.56, 338.21 and 350.20g/bird representing Tl, T2, T3, T4 and T5 respectively. The highest value was recorded in Tl(365.96g/bird) and least in T2 (332.58g/bird). There was no significant (P>0.05) difference across the dietary treatments, also, the final weight when pooled, did not differ significantly (P>0.05) among the treatment groups with the means 114417, 1043.12, 1089.28, 1021.84 and 1000.77g/bird for Tl, T2, T3, T4 and T5 respectively. Tlrecorded the highest value (1144.17g/bird) while the least was obtained inT5 (1000.77g/bird).The average daily weight gain at the starter phase of the birds'growth was highest in Tl(19.30g/bird) and lowest in T2 (16.66g/bird). On numerical grounds however, the values were not significantly (P>0.05) different among the treatment groups. At the finisher phase, there was also no significant (P>0.05) difference across the treatment groups. Birds fed Tl (control) recorded the highest performance in terms of average daily weight gain (36.27g/bird) whilst birds fed on T5 (16%) toasted white sesame seeds had the lowest average daily weight gain (28.43g/bird). When the performance of the experimental birds for the two phases (starter and finisher) were pooled, birds fed Tl (0%) TWSS also had the highest average daily weight gain (27.76g/bird) and the least (23.23g/bird) average daily weight gain was obtained on birds fed T5 (16%) Toasted White Sesame Seeds, there was no significant (P>0.05) difference in pooled performance of the birds.

Feed conversion ratio (FCR)
Feed conversion ratio was superior in Tl (2.69) whereas, inferior FCR was observed in T3 (3.00). At the finisher phase, T4 (2.68) gave a superior FCR and poorer FCR was observed in T2 (2.86). When the values were pooled, Tl (2.74) still maintain its superiority in terms of FCR and T2 (2.87) had the poorest.

Mortality
Record of mortality is presented on tables 6 and 7. Five mortalities (3%) have been recorded at the starter phase, with one (1) each from Tl, T3 and two (2) from T5 respectively. The finisher phase had one (1) mortality (0.7%) in T4.

Table 9:- The economic analysis production of broiler chicken fed toasted white sesame seed as supplement for methionine.

			Treats		
Parameter	T_1	T_2	T_3	T_4	T_5
Initial feed intake (kg/bird)	4.30	4.06	4.13	3.83	3.77
Feed cost (N/kg)	127.67	128.20	135.32	142.72	148.79
Cost of total feed intake (N)	548.98	520.49	558.87	546.62	560.94
Total weight gain (kg)	1.56	1.42	1.48	1.37	1.30
Feed cost (N/kg gain)	351.91	336.54	377.61	398.99	431.49

KEY: Treats=Treatments

Economic analysis of broiler chickens fed TWSS
The economic analysis of broiler chickens fed toasted white sesame seeds (TWSS) as supplementation for methionine is presented in Table 9. Total feeds intake per bird was observed to be 4.30, 4.06, 4.13, 3.83 and 3.77Kg and for Tl, T2, T3, T4 and T5 respectively. The total feeds intake (4.30Kg) was observed in Tlas the highest, while the least (3.77Kg) was obtained in T5. T5 had the highest feeds cost (N148.79/Kg) while Tlhad the least feeds cost (N 127.67/Kg). Cost of total feeds intake revealed that T5 had the highest value (N 560.94/Kg) while T2 recorded the lowest value (N 520.49/Kg). The highest total weight gain (1.56Kg) was observed in Tl, whereas T5 recorded the lowest value (l.30Kg) for the total weight gain. Feeds cost (N /Kg gam) showed that T5 had the highest feeds cost (N 431.49/Kg) with T2 having the lowest feeds cost (336.54/Kg gain).

Economic analysis of broilers fed TWSS
The economic analysis of broiler chickens fed TWSS as supplementation for methionine was influenced by the levels of TWSS. It was observed that the feeds cost increased as the level of inclusion of TWSS increased. T5 (16%) TWSS had the highest feeds cost (N 148.79/Kg), while Tl(control) recorded the least cost (N 127.67/Kg). The high cost of feeds (N /Kg) observed as the level of inclusion of TWSS increases, could be attributed to the high cost of sesame seedsas a result of high demand at the period of purchase from the market. Similar observation was made by Agbuluet al. (2010) and Ngeleet al. (2011) who found a continued increase in the feedscost (N /Kg) as the level of inclusion of sesame seeds increased. They therefore attributed their findings to the period the sesame seeds were purchased. It however disagreed with Turaki (2005) who reported that it is cheaper to use sesame in formulating diet

for broilers production than synthetic methionine. But this assertion could only be possible if sesame seeds were purchased at the time of availability, preferably at the time of harvest when the price is low as a result of high supply and low demand. The cost of total feeds intake (N 560.94/Kg) was observed to be higher in T5, followed by T3 (N 558.87/Kg), Tl (N 548.98/Kg), T4 (N 546.62/Kg) and the leastN520.49/Kg) was recorded in T2 respectively. This variation in the cost of total feeds intake (N /Kg) was as a result of the differences also recorded in the total feed intake (Kg/bird) and the feedscost (N /Kg) in the various treatment groups.

Total weight gain (1.56Kg) was observed to be the highest in Tl(control), followed closely by T3 (1.48Kg), T2 (1.42Kg), T4 (1.37Kg) and T5(l.30Kg) as the least respectively. The feeds cost (N /Kg gain) was observed to be higher as the cost of total feeds intake (£F /Kg) was high, with T5recording the highest value (N 431.49/Kg gain), while T2 had the lowest feeds cost (N 336.54kg gain). Since there is a relationship between the costs of total feeds intake (N /Kg), total weight gain (Kg) and the feeds cost (N I/Kg gain), the differences in the feeds cost (N /Kg) was as a result of differences in the cost of total feeds (N I/Kg). The result is in agreement with Ngeleet al. (2011) who observed an increase in the feed cost (NI/Kg gain) as the total feeds cost (N Iper bird) increases, this shows that T2 (4%) TWSS diet was more economical for feeding broiler chickens followed by Tl (control) diet than other diets containing sesame seeds. The reason could be due to the high cost of sesame seeds at the period it was purchased. To derive economic advantage, it therefore becomes pertinent on the part of farmers wishing to use sesame seeds in place of synthetic methionine to include the TWSS at 4% in broiler diets. Alternatively, the seed should be purchased at harvest season when the costs of the seeds are usually low, otherwise it could be uneconomical.

Summary, Conclusion and Recommendations:-

Summary:-

A research was conducted to determine the effect of toasted white sesame (Sesamumindicum) seeds meal as methionine supplement in broiler diets, total of one hundred and fifty (150) unsexed Anak-2000 white strain broiler chicks were used for the study. The chicks were randomly allocated into five (5) dietary treatment groups of thirty (30) birds per treatment and replicated three times with ten (10) birds per replicate in a CompletelyRandomized Design (CRD). Five experimental diets were formulated with toasted white sesame seeds supplementation levels at 0%, 4%, 8%, 12% and 16% for Tl, T2, T3, T4 and T5 respectively.

Data were collected on the growth performance and the economics of producing broiler chickens. The results of the experiment showed that performance parameters (feed intake, body weight gain, feeds conversion ratio and mortality) were not significantly different (P>0.05) among the treatment groups except for the daily feeds intake which was significantly different (P<0.05) at the finisher phase of the broilers chickens growth and with Tl (control) having the highest value, while T5 had the least value. Considering the results of the economics of production using the experimental diets, indicates that the feeds cost (N /Kg) diet increased with the corresponding increase in the supplementation levels of the diets. Feeds cost (N /Kg gain) also followed same trend except the Tl (control). In general, toasted white sesame seeds meal has been found to be an alternative source of methionine in broiler chicken production, though sesame seeds could be a potential source of vegetable protein that can supplement synthetic methionine, it will be more advantageous if only the farmers produce the commodity locally or purchase the seeds when they are available and less costly.

Conclusion:-

Result of this study revealed that toasted white sesame seeds meals have been found to be an alternative source of methionine used in formulating diets for the production of broiler chickens. It can therefore be included in broiler diets at 4% level of inclusion as a supplement for synthetic methioninewithout having effects on growth performance, Equally, at same inclusion level (4%), toasted whitesesame seeds meal could cut down the cost of broiler production associated with the high cost of synthetic methionine, thereby encouraging local farmers to engage in the business of poultry production, particularly broiler chickens.

Recommendation:-

Based on the results of the study, it has evidently indicated that toasted white sesame seedsmeal could be used by farmers to formulate diets for broiler chickens production. The supplementation of TWSS at 4% will be appropriate because it met the methionine needs of broiler chickens for improved performance, and also reduce the cost of production as a result of rising cost of synthetic methionine. To further cut down the cost of producing broiler chickens using TWSS, it is important farmers should produce the seeds locally or purchase the seeds at harvest seasons for use during off-season. However, white sesame seeds could be a potential vegetable protein source as a methionine supplement in broiler diets. Therefore, further research using same experimental diets to be conducted during harvest periods of sesame seeds to ascertain the economics of production compared to the present research in terms of economic gain.

Compliance with ethical standards
Disclosure of conflict of interest
No conflict of interest to be disclosed.

Statement of ethical approval
Procedures involved were humanely considered for the well-being of the animal and were incorporated into the design, conduct and reasonably practicable, No alternative to the use of animals possible, minimum number of animals were used and unnecessary duplication was avoided, procedures and husbandry are refined.

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