



Productive Performance and Cost Effectiveness of Broiler Chickens Fed Yellow Maize Diet Supplemented with Graded Levels of Synthetic Methionine.

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Abstract

Eight weeks (56 days) feeding trial was carried out using a total of three hundred (300) day old broiler chicks to determine the growth performance and cost implication of broiler chicks fed yellow maize supplemented with graded levels of methionine. Three hundred (300) day-old unsexed broilers chicks were randomly assigned to five (5) treatments. Each Treatment was replicated thrice with twenty (20) chicks per replicated. Five dietary treatments of sixty birds per treatment with three replicates of 20 birds as T₁, T₂, T₃, T₄ and T₅ and R₁, R₂ and R₃ respectively. Diets were formulated in which yellow maize was supplemented with graded levels of methionine at 0.1, 0.2, 0.3, 0.4 and 0.5% for T₁, T₂, T₃, T₄ and T₅ respectively. The study was conducted in a Completely Randomized Design (CRD), and birds were randomly assigned to five dietary treatments. The experiment lasted for 8 weeks in two phases, 1 – 4 weeks (starter phase) and 5 – 8 weeks (finisher phase). All data generated were subjected to one way analysis of variance (ANOVA) in a Completely Randomized Design (CRD). Differences between means were compared using Duncan Multiple Range Test or the IMB Statistical package for Social Science (SPSS)/modified MINITAB. The result of growth performance revealed that the daily feed intake (DFI) were significantly ($P < 0.05$) different among the groups. The daily weight gain (DWG) were not significantly ($P > 0.05$) different. Feed conversion ratio (FCR) were significantly ($P < 0.05$) influenced, but the best FCR in the final phase was in T₅ (2.34). The study revealed that, yellow maize can be supplemented with graded levels of synthetic methionine at upto 0.5% level without any adverse effect on the productive performance of the birds. Feed cost (FC) was however highest in T₅ (246.98) N/kg and least value in T₁ (219.41) N/kg, while the total feed cost (TFC), was also highest in T₅ (N1,063.46) and least in T₁ (N891.13). As can be observed, FC per kg body weight gain increased with increasing levels of methionine across the treatments. Therefore, diet 1 which had 0.1% methionine gave the least cost per kg gain (N517.81) and is recommended for broiler chickens production.

Keyword: Maize, Broiler chickens, Synthetics methionine, Growth, Cost.

Introduction

Available information and data on the animal protein availability and consumption in Nigeria clearly indicate protein crises. Okuneye (2002) described Nigeria as a protein deficient country with the daily animal protein consumption reported to be below the Food and Agriculture Organization recommendation of 20g/day for people developing countries. Majority of Nigerians consume farless than this recommendation which does not augur well with physical wellbeing of citizenry. Efforts

have been intensified by animal scientists especially animal nutritionists to bridge this gap since the major obstacle militating against achieving this lofty goal is the cost of conventional feedstuff especially those that are being consumed by human beings and are also being used for various industrial purposes.

Poultry has been identified as the fastest means of bridging the protein deficiency gap prevailing in most tropical countries like Nigeria (FAO, 1990). However, the

future development of the poultry industry in many regions of the world depends to a large extent on the availability of feedstuff in these areas that are suitable or can be suitable for use in poultry feed. Conventional poultry diets are mostly corn and soyabean based. Cereal grains especially maize has been for long used as conventional energy source in broiler production. This is simply because maize served as the basis against which other grains are compared (Atteh, 2002). Maize is the most widely used cereal grain in poultry feeding around the world and is regarded as possessing better nutritional attributes than other cereal grains (Ajaja and Aletor, 2011). Maize is the most utilized cereal in formulation of broiler feeds in the world (Panda *et al.*, 2010). It constitutes about 50-60% in most poultry diets (Ibitoye *et al.*, 2012), contributing approximately 65% of the total Metabolizable Energy (ME) requirement of the chickens (Cowieson, 2005).

The conventional poultry diets are mostly corn and soyabean based and corn (maize) is usually low in lysine, while legumes especially soyabean are low in methionine. With this combination of feed ingredients, one way of meeting the methionine requirements is to feed excessive protein to meet daily intake of methionine which is not economical as it increases feed cost and also result in an excessive nitrogen excretion and is not environmentally friendly. Supplementing it synthetic methionine will definitely improve its nutritional value and prevents feeding excessive dietary protein. The use of synthetic methionine in poultry diets makes it possible to feed lower levels of dietary protein and still meet the daily methionine requirement and at the same time save feed cost. Methionine is an essential amino acid that cannot be produced by commercial broilers in adequate amounts to support maximum growth. Broilers have a high methionine requirements that cannot be obtained from the corn and soyabean fraction of diets;

therefore, broilers require an additional source of methionine as synthetic methionine has been used in corn-soyabean-based diets to meet broiler requirement of methionine without providing excessive crude protein.

Yellow Maize

Maize is a staple food for millions of people in sub-Saharan Africa. Although white maize is more popular in most household, only few know that yellow maize is more nutritious than white maize. According to Aduku (2004), maize is an excellent and most popular source of energy and that white and yellow maize exist but yellow maize (which was used in this experiment) is preferred for animals because it contains cryptoxanthin, which is a precursor of vitamin A. It is however low in crude protein (8-9%), crude fibre (2.7%) and calcium. In addition to the taste and colour, research has shown that yellow corn has a higher nutritional value than the ordinary white maize, due to its higher levels of lutein, carotenoids and vitamin A. Vitamin A deficiency is very common in Africa and afflict millions of children, resulting in diseases like blindness and even death (NRP, 1994). One large cob of boiled yellow maize contain almost 4g of protein, 3.5g of dietary fibre, about 30g of carbohydrates, 1.5g of fat and 3.6g of sugar and 100 grams of water (NRP, 1994). The reports also confirms that it contains cholesterol and has about 126 kilo-calories. Yellow maize also contains both pro-vitamin A and non-pro-vitamin A carotenoids, which promotes general growth and eye health (NRP, 1994). Although most people prefer white maize, it is better to know that carotenoids are mainly found in yellow maize. White maize has little or no carotenoids. This beta-carotene content is an important source of vitamin A. Also the carcass of broiler chicks fed with yellow maize is more attractive with yellow body pigments especially the legs and skin as a result of all these additional qualities mentioned.

Materials and Methods

Study area / experimental site: The study was carried out at the Poultry Units of Teaching and Practical Farm of Taraba State College of Agriculture, Jalingo. The state is in the North-East geo-political zone of Nigeria. It lies between latitude 8° 52' 59 N and 11° 22' E North and longitudes 8.89° N and 11.38 E East of the equator in the Savannah zone of Northern Nigeria (TRSD, 2008). There are two main seasons existing in the area of study. It has an annual rainfall of 1000 - 1500mm with temperature range of 30⁰ - 42⁰. The state characterized by tropical climate marked by dry and rainy/wet season. The rainy season usually commence in the month of March and ends in October, while dry season start in later October and ends in March (TRSD, 2008).

Experimental Birds and Management

Three hundred (300) day old Anak white broiler chicks of mixed sexes were used for the experiment. The chicks were raised/brooded on a deep litter management system for a period of one week. Thereafter, the chicks were randomly allocated to various experimental treatments with all necessary management practices like vaccination carried out as at when due.

$$FCR = \frac{\text{Daily feed intake/bird(g)}}{\text{Daily weight gain/bird(g)}}$$

The economic benefits of production were determined according to Oyewole (2011). The indices obtained include cost of producing 1kg of feed (₦/kg), cost saving due to inclusion of methionine, feed cost/bird, cost of feed/kg weight gain. Cost of feed was determined using market process of ingredients during the experiment. Cost of producing 100kg of each feed was estimated and then used to determine consumed feed cost/bird, cost of feed and cost of feed/kg weight gain per bird.

Statistical Analysis

Experimental Diets and Design

The study was conducted in a Completely Randomized Design (CRD). Five (5) experimental groups sixty (60) birds which represent treatment were replicated into three (3) replicates of twenty (20) birds per replicate coded as R₁, R₂ and R₃. The treatment were the different diets. The diets were formulated in which yellow maize was supplemented with graded levels of synthetic methionine at 0.1, 0.2, 0.3, 0.4 and 0.5% for T₁, T₂, T₃, T₄ and T₅ respectively. The feeding trial lasted for eight (8) weeks. Feeds and water were supplied *ad libitum* throughout the study.

Data Collection

The performance data evaluated were daily feed intake (DFI), which was obtained by subtracting the quantity of feed left over from the quantity of feed given daily. Daily weight gain (DWG) was obtained by dividing the total weight gain per replicate by the number of birds and seven (7) days per week. Feed conversion ratio (FCR) was calculated as the feed intake per unit weight gain. This was done for each replicate by dividing the average daily feed intake/bird with the average daily weight gain/bird.

All data generated from experiment were subjected to one way analysis of variance (ANOVA) in a Completely Randomized Design (CRD) according to Steel and Torrie (1980). Differences between treatment means were compared using Duncan Multiple Range Test (DMRT) (Duncan, 1955) or the IMB Statistical Package for Social Science (SPSS, 2012) modified MINTAB.

Proximate Analysis

Proximate analysis of feed/diet is the determination of the major components of feed which include moisture, lipids (fats), ash (minerals), protein, carbohydrate and

fibre. These methods are however not in any way perfect but act as guide for empirical estimations. Procedures recommended by AOAC, (1984), that is Association of Official Analytical Chemist, were used for the analysis.

Results and Discussion

The ingredients composition of broiler starter and finisher diets were as presented in Tables 1 and 2. In the starter, the yellow maize ranged between 46.57 – 47.10%, while in the finisher it ranged from 52.56 – 53.09%. This can be explained by the fact that in the starter phase, birds require less energy and more of crude protein unlike in the finisher phase where more energy is required to less crude protein. The inclusion levels of soyabean, crude protein source is 33.60 – 33.73% from T₁ – T₅ in the starter phase and 22.61 – 22.74% in the finisher

phase. The obvious reason being that at starter phase birds requires more protein in the diet and less in the finisher phase. Every other ingredient remains the same except the synthetic methionine that varied from T₁ – T₅. The proximate composition (%) of experimental starter and finisher diets were as presented in Tables 3 and 4 respectively. It ranged from 22.05 – 23.20% crude protein in the starter phase and 20.15 – 21.55% in the finisher phase. This is observed to be within the recommended protein requirement of 22 – 24% and 18 – 20% by Olomu (2011) for starter and finisher phases. In young animals, protein requirement is high but decreased with age or on progressive maturity. This also agree with the submission of Alaku (2010), that young growing poultry requires greater amount of protein than adults.

Table 1. Ingredients Composition of Broiler Starter Diets (1-4 Weeks) Containing yellow maize Supplemented with varying Levels of methionine (%)

Ingredient	Treatment/Diets (Levels of Synthetic Methionine)				
	T1 (0.1%)	T2 (0.2%)	T3 (0.3%)	T4 (0.4%)	T5 (0.5%)
Yellow Maize	47.10	46.96	46.82	46.69	46.57
Soya bean	33.60	33.64	33.68	33.71	33.73
Wheat offal	10.00	10.00	10.00	10.00	10.00
Synthetic methionine	0.1	0.2	0.3	0.4	0.5
Fish Meal	5.00	5.00	5.00	5.00	5.00
Bone Meal	2.00	2.00	2.00	2.00	2.00
Lime Stone	1.5	1.5	1.5	1.5	1.5
Salt	0.25	0.25	0.25	0.25	0.25
Premix*	0.25	0.25	0.25	0.25	0.25
Lysine	0.2	0.2	0.2	0.2	0.2
Total	100	100	100	100	100
Calculated analysis					
Crude Protein	23.03	23.00	23.00	23.00	23.00
ME/kcal/kg	2927.09	2921.05	2917.48	2913.95	2910.44
Crude fibre (%)	3.83	3.82	3.82	3.82	3.82
Calcium (%)	1.61	1.61	1.61	1.61	1.61
Phosphorous (%)	0.82	0.82	0.82	0.82	0.82
Lysine (%)	1.46	1.49	1.41	1.41	1.47
Methionine (%)	0.56	0.58	0.60	0.62	0.64

*Vitamin-mineral premix provided per kg; Vit. A 1500 IU; Vit.D₃ 3000 IU; Vit.E 30 IU; Vit. K 2.5mg; Thiamine B₁ 3mg; Riboflavin B₂ 6mg; Pyrodoxine B₆ 4mg; Niacin 40 mg; Vit. B₁₂ 0.02mg; Pantothenic acid 10mg;Folic acid 1mg; Biotin 0.08mg; Chloride 0.125mg; Mn 0.0956g; Antioxidant 0.125g; Fe 0.024g; Cu 0.006g; 10.0014g; Se 0.24g; Co 0.240g

Table 2: Ingredients Composition of Broiler Finisher Diets (5 - 8 Weeks) Containing yellow maize Supplemented with varying Levels of methionine (%)

Ingredient	Treatment/Diets (Levels of Synthetic Methionine)				
	T1 (0.1%)	T2 (0.2%)	T3 (0.3%)	T4 (0.4%)	T5 (0.5%)
Yellow Maize	53.09	52.97	52.82	52.70	52.56
Soya bean	22.61	22.63	22.68	22.70	22.74
Wheat offal	13.00	13.00	13.00	13.00	13.00
Synthetic methionine	0.1	0.2	0.3	0.4	0.5
Fish Meal	5.00	5.00	5.00	5.00	5.00
Palm Oil	2.00	2.00	2.00	2.00	2.00
Bone Meal	2.00	2.00	2.00	2.00	2.00
Lime Stone	1.5	1.5	1.5	1.5	1.5
Salt	0.25	0.25	0.25	0.25	0.25
Premix*	0.25	0.25	0.25	0.25	0.25
Lysine	0.2	0.2	0.2	0.2	0.2
Total	100	100	100	100	100

Calculated analysis

Crude Protein	20.00	20.00	20.00	20.00	20.00
ME/kcal/kg	2990.98	2987.48	2982.33	2980.38	2976.81
Crude fibre (%)	3.42	3.42	3.42	3.41	3.41
Calcium (%)	1.61	1.61	1.61	1.61	1.61
Phosphorous (%)	0.79	0.79	0.74	0.76	0.74
Lysine (%)	1.18	1.18	1.18	1.18	1.18
Methionine (%)	0.55	0.57	0.59	0.61	0.63

*Vitamin-mineral premix provided per kg; Vit. A 1500 IU; Vit.D₃ 3000 IU; Vit.E 30 IU; Vit. K 2.5mg; Thiamine B₁ 3mg; Riboflavin B₂ 6mg; Pyridoxine B₆ 4mg; Niacin 40 mg; Vit. B₁₂ 0.02mg; Pantothenic acid 10mg; Folic acid 1mg; Biotin 0.08mg; Chloride 0.125mg; Mn 0.0956g; Antioxidant 0.125g; Fe 0.024g; Cu 0.006g; 10.0014g; Se 0.24g; Co 0.240g

Table 3: Proximate Composition (%) of Experimental starter Diets Containing yellow maize Supplemented with varying Levels of methionine (%)

Nutrients	Treatment/Diets (Levels of Synthetic Methionine)				
	T1(0.1)	T2(0.2)	T3(0.3)	T4(0.4)	T5(0.5) Dry
Matter	86.90	87.40	85.90	86.10	86.10
Moisture Content	13.10	12.60	14.10	13.90	13.90
Crude Protein	22.05	22.95	22.40	23.20	22.65
Crude Fibre	3.70	3.50	4.10	4.30	3.40
Ash	2.90	4.30	4.20	4.90	4.90
Ether Extract	8.26	7.68	7.55	7.90	8.35
NFE	49.99	51.97	47.65	43.80	46.80
ME (Kcal/kg)	2359.56	3205.17	3131.93	3127.20	3175.80

NFE = Nitrogen Free Extract

ME = Metabolizable Energy

ME(kcal/kg) = 37 x % CP + 81 x % EE + 35.5 x % NFE (Pauzenga, 1985).

Table 4: Proximate Composition of Experimental finisher Diets Containing yellow maize Supplemented with varying Levels of methionine (%)

Treatment/Diets (Levels of Synthetic Methionine)					
Nutrients	T1(0.1)	T2(0.2)	T3(0.3)	T4(0.4)	T5(0.5)
Nutrients(g)					
Dry Matter	85.80	86.60	87.00	86.80	87.40
Moisture Content	14.20	13.40	13.00	13.20	12.60
Crude Protein	20.85	21.20	20.15	21.55	20.85
Crude Fibre	4.20	3.90	5.40	5.40	4.20
Ash	3.00	2.90	3.10	4.30	4.70
Ether Extract	8.71	8.71	8.29	6.58	9.13
NFE	52.04	52.63	53.06	50.87	52.52
ME(Kcal/kg)	3226.16	3268.34	3189.67	3025.22	3227.44

NFE = Nitrogen Free Extract
 ME = Metabolizable Energy
 ME(kcal/kg) = 37 x % CP + 81 x % EE + 35.5 x % NFE (Pauzenga, 1985).

Productive Performance

Results of Daily Feed Intake (DFI), daily Body Weight Gain (BWG), Feed Conversion Ratio (FCR) and Mortality for the experimental period (56 days) are presented in Table 5. The results showed that DFI increased significantly (P<0.05) with increased level of synthetic methionine. This agree with the report of Alfred, (2014) and Ajide *et al.* (2019) who reported similar findings. This can also be buttressed by the report of Summer *et al.* (1992), that the levels and balance of essential amino acids (EAAs) significantly affect feed intake and consequently weight gain and carcass composition. Broiler chicks appear to react to amino acid deficiencies within a short period (hours) by adjusting their feed intake and/or selection and these responses are influenced by age and prior experience (Picard *et al.*, 1993). However, Bunchasak *et al.* (1996, 1998), and Bunchasak and Keawarun (2006) reported that methionine deficiencies depress feed intake of broiler chicks due to amino acid imbalance. It can be assumed that under amino acid imbalance, chicks lose the potentials to adjust feed intake to satisfy their amino acid requirement. The main positive effect of methionine supplementation may come from its

improvement of feed intake via the amino acid imbalance. As it can be observed, feed intake increased slightly with increased levels of synthetic methionine supplementation with the lowest (110.86g) in T1 and highest 113.44g in T5 in the finisher phase which is in the range of 83.64 – 100.77g reported by Alfred, (2014) and 85 – 115g per day reported by Wikivet (2012).

DWG were not significantly (P>0.05) different in all phases. The values of DWG in the finisher phase ranged from 65.12 – 70.95g. This is consistent with the result of Nyameh (2014), Lalabe, (2014), Younis (2014). Amaefule *et al.* (2005) and Oguntoye *et al.* (2018) who observed that DWG were influenced positively by DL-methionine in their work on effect of dietary supplementation of DL- methionine and sodium sulphate on growth performance, carcass characteristics and cost benefits analysis of broiler chickens fed maize – cassava based diets. As can be observed in the finisher phase, DWG increased slightly with increased levels of methionine inclusion. This is consistent with Wallis (1999) and Cardiac and Koncagul (2014) who reported that there is a trend of increasing daily body weight gain as methionine intake increases and that

chickens grow significantly faster and ate more when there was an increase in the level of methionine in the diet. The FCR were significantly ($P < 0.05$) influenced with values of 2.34 – 2.56 in the finisher phase, which agree with Pue, (2016) and Parkhaust and Moutney (1997) who reported 1.90 – 2.50 and observed that FCR in a well-managed broiler houses should be in that range (1.90 – 2.50) or better depending on the nutrient density, time of year and other factors. However, Oluyemi and Roberts (2000) recommended FCR of 2.10 – 5.10. The best value in this experiment is in T₅ (2.34). The lowest values in this experiment is an indication of better utilization of the feed. The mortality rate of 6.33% is higher than 5% recommended by Oluyemi and Roberts (2000), who suggested that mortality rate should not exceed 5% to maximize profit and minimize the cost of feed lost which account for upto 20-25% of the production cost of broiler chickens. The highest mortality was in T₁ and T₂ (6 birds), followed by T₃ (4 birds) and the least was in T₅ (1 bird). As can be observed, mortality decreased with increased inclusion levels of methionine. This is consistent with the report of Bunchasak (2009), who stated that adding methionine to a low protein diet reduced the mortality rate of hens under heat stress when compared to positive control groups. This is also in agreement with Lokesh and Singhan (2011), and Ajide *et al.* (2019), who reported that the nutrients

which have immune-modulating effect include protein and energy, vitamins A, E and C. the presence of vitamin A, increased in methionine and lutein in yellow maize boost immunity of birds. Final weight gain and total weight gain were significantly ($P < 0.05$) increased with increasing levels of synthetic methionine. Improved weight gain with increasing levels of methionine was reported by Garlick (1985). The improvements observed at the finisher phase could be associated with advanced digestive tract of the finisher birds which enhanced better nutrient digestion and utilization. The older the birds the better the ability to utilize nutrients (Fafiolu, 2008).

The economics of feeding yellow maize supplemented with graded levels of methionine is presented in Table 6. The total feed intake (TFI) ranged from 4.18kg in T₁ to 4.49kg in T₅, while the feed cost (FC) ranged between 219.41 (N/kg) in T₁ to 246.98 (N/kg) in T₅. Total feed cost (TC) ranged between N891.13 in T₁ and N1,063.46 in T₅, while total weight gain ranged between 1.04kg in T₅ to 1.20kg in T₂. As can be observed, the TFI increased slightly with increased inclusion levels of methionine from T₁ – T₅, same also is FC (N/kg) being in T₁ for the simple reason that with increased inclusion levels of methionine the FC increased as a result of the high cost of methionine.

Table 5: Performance of Broiler Chickens fed Yellow Maize Supplemented with Graded Levels of Synthetic Methionine (1 – 8 weeks)

Parameters	Diets					SEM
	T1	T2	T3	T4	T5	
Starter phase (1 – 4 weeks):						
Initial Weight (g)	91.67	92.67	92.00	91.83	93.00	0.67 ^{NS}
Final Weight (g)	607.00 ^d	606.33 ^d	613.33 ^c	621.33 ^b	631.67 ^a	1.26*
Daily Feed Intake (g)	59.22 ^d	58.92 ^d	59.67 ^c	61.79 ^b	63.92 ^a	0.22*
Total feed intake	1658.16	1649.76	1670.76	1730.12	1789.76	0.38*
Daily weight gain (g)	18.40	18.35	18.62	18.91	19.24	0.35 ^{NS}
FCR	3.22 ^c	3.21 ^c	3.20 ^c	3.27 ^b	3.32 ^a	0.02*
Mortality	3	4	2	1	0	-
Finisher phase (5-8 week)						
Week 4 Weight (g)	607.00 ^d	606.33 ^d	613.33 ^c	621.33 ^b	631.67 ^a	1.26*
Final Weight (g)	1823.33 ^c	1843.33 ^c	1840.00 ^c	1893.33 ^b	1986.67 ^a	11.98*
Total Feed Intake (g)	3104.20 ^e	3107.57 ^d	3128.24 ^c	3143.58 ^b	3176.26 ^a	1.52*
Daily Feed Intake (g)	110.86 ^e	110.98 ^d	111.72 ^c	112.27 ^b	113.44 ^a	0.05*
Daily weight gain	65.12	65.83	65.71	67.62	70.95	0.72 ^{NS}
FCR	2.56 ^a	2.52 ^{ab}	2.55 ^a	2.48 ^b	2.34 ^c	0.02*
Mortality	3	2	2	1	1	-
(Overall 1-8 weeks)						
Initial Weight (g/bird)	91.67	92.67	92.00	91.83	93.00	13.41*
Final Weight (g/bird)	1823.33	1843.33	1840.00	1893.33	1986.67	62.62*
Total weight gain	1731.66	1750.66	1748.00	1801.55	1893.67	30.12*
Daily feed intake	85.04	84.95	85.69	87.03	88.68	2.34*
Daily weight gain	30.92	31.26	31.21	32.17	33.82	1.12 ^{NS}
Total feed intake	4762.24	4757.20	4798.64	4873.68	4966.08	0.85*
FCR	2.75	2.72	2.75	2.71	2.62	
Mortality	6	6	4	2	1	

^{abcd}Means within rows with different superscript differed significantly (P<0.05),

* = significant

NS= Not significant

FCR= Feed conversion ratio

SEM= Standard Error of means

Table 6: Financial Benefits of Using Yellow Maize Supplemented with Methionine for Broiler Chickens Production

Parameters	Diets				
	T1(0.1)	T2(0.2)	T3(0.3)	T4(0.4)	T5(0.5)
TFI (kg)	4.18	4.38	4.28	4.36	4.49
FC (₦/kg)	219.41	221.47	228.56	234.30	246.98
TFC (₦)	891.13	959.70	963.17	1,069.07	1,063.46
TWG (kg)	1.17	1.20	1.15	1.15	1.04
FC (₦/kg gain)	517.81	539.40	540.39	555.29	575.46

TFI= Total feed intake

FC=Feed cost

TFC= Total feed cost

TWG= Total weight gain

Conclusion

Based on the result obtained in this study, yellow maizes can be supplemented with the grade levels of synthetic methionine upto 0.5% without any adversed effect and the best performance and least cost per kg

gain was in T1. Therefore, treatment 1 is highly recommended for broiler production.

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