HERBAL METHIONINE (METHIOREP®) IMPROVES GROWTH PERFORMANCE OF BROILER CHICKENS WITHOUT AFFECTING CARCASS CHARACTERISTICS AND BLOOD INDICES[†]

[LA METIONINA HERBAL (METHIOREP®) MEJORA EL CRECIMIENTO DE LOS POLLOS DE ENGORDA SIN AFECTAR LAS CARACTERISTICAS DE LA CANAL Y PARÁMETROS HEMÁTICOS]

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SUMMARY

Methiorep®, an herbal methionine premix, which is reported to contain herbal ingredients that mimic the activity of Methionine such as SAMe (S-Adenosyl Methionine) and phosphatidyl choline, have recently introduced to Nigeria animal feed industry. An experiment was conducted with 120, one-week-old broilers to evaluate the effect of herbal methionine (methiorep®) as substitute for synthetic methionine on growth performance of broiler chickens. Five isocaloric and isonitrogenous diets were formulated and Diet 1 (control), comprised of 0.25% methionine (NRC, 1994) while diet 2, 3, 4 and 5 comprised of 25%, 50%, 75% and 100% Methiorep® as substitute for methionine in the diets. The birds were randomly allocated to five experimental treatments, each treatment was replicated three times with eight birds per pen in a completely randomized design. The study lasted 49-days. The results of growth performance revealed that body weight gain, average feed intake and feed conversion ratio at both starter and finisher phases were not influenced by dietary treatments ($P>0.05$). However cost per kg feed decreased as the level of Methiorep® increased in the diets ($P<0.05$). The results of blood profiles and carcass characteristics were not influenced ($P>0.05$) by the dietary treatments. It was concluded that Methiorep® can completely substitute for Methionine in the diets of broiler chickens without adverse effect on growth performance, blood profiles and carcass yield of birds.

Key words: Methionine; methiorep®; growth performance; carcass; blood profiles; broiler chickens.

RESUMEN

Methiorep®, una premezcla herbal de metionina, que se reporta que contiene ingredientes a base de hierbas que imitan la actividad de la metionina, como SAMe (S-Adenosyl Methionine) y phosphatidyl choline, ha sido recientemente introducido en la industria de piensos de Nigeria. Se realizó un experimento con 120 pollos de una semana de edad para evaluar el efecto de la metionina herbal (Methiorep®) como sustituto de la metionina sintética en el comportamiento de crecimiento de pollos de engorde. Se formularon cinco dietas isocalóricas e isonitrogenadas: Dieta 1 (control), compuesta de metionina al 0.25% (NRC, 1994), mientras que la dieta 2, 3, 4 y 5 consistía de 25%, 50%, 75% y 100% de Methiorep® como sustituto de Metionina en las dietas. Las aves fueron asignadas aleatoriamente en los cinco tratamientos experimentales los cuales se replicaron tres veces con ocho aves por jaula en un diseño completamente al azar. El estudio duró 49 días. El aumento de peso corporal, la ingesta media de alimento y la conversión de alimento en las fases de inicio y finalización no fueron influenciados ($P>0.05$). Sin embargo, el costo por kg de pienso disminuyó a medida que el nivel de Methiorep®aumentó en las dietas ($P<0.05$). Los resultados de perfiles sanguíneos y características de la canal no fueron influenciados ($P>0.05$). Se concluyó que Methiorep® puede sustituir completamente a la metionina en las dietas de pollos de engorde sin efectos adversos en el crecimiento, perfiles sanguíneos y rendimiento de la canal de las aves.

Palabras clave: Metionina; Methiorep®; crecimiento; canal; perfiles sanguíneos; pollos de engorde

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INTRODUCTION

Poultry nutrition has improved a lot in the past few decades. In spite of advances made on the nutritional aspects, a lot of nutritional problems are still remaining unsolved and serve as a challenge to researchers in this field worldwide. One of the most important areas is amino acid nutrition. Of the essential amino acids required by poultry, Methionine is usually first limiting in diets based on maize and soybean meal (Fancher and Jensen, 1989). A major cause of Methionine deficiency is the fact that large amounts of vegetable protein supplements are used in feeds in combination with low levels of animal and fish proteins. It has been shown that it may be more economical to add Methionine in the diet than to add more of soybean or other natural proteins to meet the requirement (North and Bell, 1990). Methionine is required in the diets of birds to meet the increasing tissue demands associated with fast growth rate and high production performance. An important aspect of methionine and protein interrelationship is the ability of both to act as lipotropic agents. Methionine may act as a lipotropic agent through its role as an amino acid in balancing protein requirements or through its role as a methyl donor and in choline, betaine, folic acid and vitamin B 12 metabolisms (Chen *et al.*, 1993). Methionine serves as an integral portion of body protein, a precursor for cystine and an important source of dietary sulfur. Sulfur-adenosyl Methionine is a potent donor of methyl groups, which contributes to the synthesis of many important substances including epinephrine, choline, and creatinine (Bender, 1975). The increase in demand for poultry meat has given rise to the use of synthetic compounds in feed and the high price of such compounds like synthetic Methionine supplementation increases the cost of poultry feeds. Recently, the safety of such practices has been questioned and their use is becoming restricted in many regions of the world. Therefore, there is great renewed interest in developing natural alternative supplements to maintain animal performance and wellbeing (Chattopadhyay *et al.,* 2006).

Methiorep is a recent introduction to the Nigerian animal feed industry. It is manufactured in India and is reported to contain herbal ingredients that mimic the activity of Methionine. It is reported to contain SAMe (S-Adenosyl Methionine) and phosphatidyl choline. SAMe is known to be a lipotropic agent. Rajurker *et al.* (2009) reported that methiorep® is composed of *Phaseolus mungo* (mung beans), *Triticum sativum* (wheat) and *Allium sativum* (Garlic). Methiorep® also contains *Cicer arientirum* (Chick pea) and *Phaseolus vulgaris* (kidney beans) with highly available methionine. The company also claims that the benefits associated with Methiorep include: Provision of optimum Methionine activity at reduced cost, optimum protein synthesis and energy utilization, increased egg production and optimum egg size, protection against broken feathering and reduced feather pecking, better performance of breeder birds and improved growth performance, feed conversion ratio and livability in birds. Methiorep which is a phytoadditive, It has been reported to successfully replace synthetic Methionine at lower cost with comparative higher growth and production performance indices leading to higher profit in poultry business (Animal Care Service Konsult, 2008). Under Indian conditions, herbal methionine (Methiorep®) has been found to replace DL-methionine very effectively when used in broiler rations (Kalbande *et al*., 2009; Halder and Roy, 2007; Chattopadhyay *et al.,* 2006). However, Itoe *et al.*(2010) reported that Methiorep® is not substitute for synthetic methionine in broiler diets under Nigerian environment. Thus the current study was conducted to determine the effects of herbal methionine as a substitute for synthetic methionine on growth performance of broiler chickens.

MATERIALS AND METHODS

Experimental site

The research was carried out at the Poultry Research Unit of the Federal College of Wildlife Management, New Bussa, Niger State, Nigeria. The poultry building is an open sided type that permits adequate ventilation in the house, with a concrete floor and zinc-roofing sheet. New Bussa sits at 9°53′N 4°31′E, and the original town of Bussa is located about 40 km North of New Bussa at 10°13′51″N 4°28′31″E (altitude 170 m.a.s.l.). The climate of the area is tropical with monthly average temperature of 34°C and mean annual relative humidity of 60%.

Experimental birds

A total of 120 day old broiler chicks were purchased from a reputable hatchery in Ibadan. The birds were randomly allocated to five dietary treatments replicated thrice with 8 birds per replicate in a completely randomized design and housed in pens under the deep litter system.

Experimental diets

Five isocaloric and isonitrogenous diets were formulated and Diet 1 (control), comprised of 0.25% methionine (NRC, 1994) while diet 2, 3, 4 and 5 comprised of 25%, 50%, 75% and 100% Methiorep, (supplied by Ayurvet Limited, Baddi, India) as substitute to methionine in the diets. All diets were formulated to meet the requirements for energy,

protein, calcium, phosphorus and Methionine that have been established for broiler chicken in Nigeria (Olomu, 1995; Dafwang, 2006). The birds were fed on a common diet for one week before being randomized and fed the starter diets from 1-4 weeks and finisher diets from 5-8 weeks of age. Feed and water were given *ad libitum*. Table 1 and 2 show the gross composition of experimental diets.

Performance data

The amount of feed given and left over was recorded on daily basis and it was used to calculate the feed intake. Before the commencement of the experiment, the initial weight of the birds were taken and the birds were weighed weekly thereafter to obtain weekly weight gain. Feed intake and weight recorded were used to calculate feed conversion ratio (FCR) using the formula:

Feed conversion ratio (FCR) =feed intake/weight gain

Blood collection

At the end of the study period, 5ml of blood was collected from three birds per treatment through the wing vein and put into bottles containing Ethylene Diaminetetra- acetic Acid (EDTA) to determine the packed cell volume (PVC), red blood cell (RBC), haemoglobin (Hb), and white blood cell (WBC). Blood sample meant for serum biochemical studies were collected into plane bottles (without Anti-coagulant) to enhance serum separation. The blood serum obtained was used to determine total protein (TP), Albumin, Globulin, Glucose and Urea. All the analysis was done at the College Research Laboratory according to the methods described by Kohn and Allen (1995); Schalm *et al*. (1975); Peters *et al.* (1982).

Carcass and Organs Weight determination

At the end of the study, two birds per replicate were selected at random and starved for about 12h to empty the crops. They were then slaughtered, scalded, plucked and eviscerated. The carcass and internal organs (liver, heart, kidney, gizzard and intestines) were removed, weighed and expressed as a percentage of live weight.

Statistical analysis

Data collected were subjected to analysis of Variance using SAS software (SAS, 2008) while significant means were separated with Duncan multiple range test at 5% level of significance.

Table 1. Gross composition of broiler starter diet (1-4 weeks)

Ingredients, Kg	0%mp	25%mp	50%mp	75%mp	100%mp
Maize	50.00	50.00	50.00	50.00	50.00
Groundnut cake	30.00	30.00	30.00	30.00	30.00
Soyabean	14.00	14.00	14.00	14.00	14.00
Fishmeal	2.00	2.00	2.00	2.00	2.00
Bonemeal	2.00	2.00	2.00	2.00	2.00
Limestone	1.00	1.00	1.00	1.00	1.00
Salt	0.25	0.25	0.25	0.25	0.25
*Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.19	0.12	0.06	0.00
Methiorep	0.00	0.06	0.13	0.19	0.25
Total	100	100	100	100	100
Calculated Nutrients, %					
Energy (Kcal/Kg ME)	2836.67	2836.67	2836.67	2836.67	2836.67
Crude Protein	23.41	23.33	23.33	23.40	23.40
Crude fibre	3.32	3.32	3.32	3.32	3.32
Ether extract	5.10	5.10	5.10	5.10	5.10
Calcium	1.30	1.30	1.30	1.30	1.30
Phosphorus	1.00	1.00	1.00	1.00	1.00
Methionine	0.50	0.50	0.50	0.50	0.50
Lysine	1.23	1.23	1.23	1.23	1.23

* Vitamin/Mineral premix from Bio-mix Broiler finisher supplied per kg of diet: Vit.A. 10,000 i.u; Vit.D3, 2000ni.u; Vit.E 23mg; Vit.K, 2mg; Vit.B1 (Thiamine) 1.8mg; Vit.B2 (Ribloflavin) 5.5mg; Vit.Bc (Pyridoxine), 3.0mg; Vit. B12 0.015mg; Pantothenic acid 7.5mg; Folic acid 0.75mg; Niacin 27.5mg; Biotin 0.6mg; Choline chloride 300mg; Cobalt 0.2mg;Copper 3mg; Iodine 1mg; Iron 20mg; manganese 40mg; Selenium 0.2mg; Zinc 30mg; Antioxidant 1.2mg; ME = Metabolisable Energy, mp = methiorep

Table 2. Gross composition of broiler finisher diet (5-8 weeks)

Ingredients, Kg	0%mp	25%mp	50%mp	75%mp	100%mp
Maize	54.00	54.00	54.00	54.00	54.00
Groundnut cake	30.00	30.00	30.00	30.00	30.00
Soyabean	10.00	10.00	10.00	10.00	10.00
Fishmeal	2.00	2.00	2.00	2.00	2.00
Bonemeal	2.00	2.00	2.00	2.00	2.00
Limestone	1.00	1.00	1.00	1.00	1.00
Salt	0.25	0.25	0.25	0.25	0.25
*Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.19	0.12	0.06	0.00
Methiorep	0.00	0.06	0.13	0.19	0.25
Total	100	100	100	100	100
Calculated Nutrients, %					
Energy (Kcal/Kg ME)	3006.67	3006.67	3006.67	3006.67	3006.67
Crude Protein	19.41	19.33	19.33	19.40	19.40
Crude fibre	4.00	4.00	4.00	4.00	4.00
Ether extract	4.70	4.70	4.70	4.70	4.70
Calcium	1.40	1.40	1.40	1.40	1.40
Phosphorus	1.05	1.05	1.05	1.05	1.05
Methionine	0.50	0.50	0.50	0.50	0.50
Lysine	1.23	1.23	1.23	1.23	1.23

* Vitamin/Mineral premix from Bio-mix Broiler finisher supplied per kg of diet: Vit.A. 10,000 i.u; Vit.D3, 2000ni.u; Vit.E 23mg; Vit.K, 2mg; Vit.B1 (Thiamine) 1.8mg; Vit.B2 (Ribloflavin) 5.5mg; Vit.Bc (Pyridoxine), 3.0mg; Vit. B12 0.015mg; Pantothenic acid 7.5mg; Folic acid 0.75mg; Niacin 27.5mg; Biotin 0.6mg; Choline chloride 300mg; Cobalt 0.2mg;Copper 3mg; Iodine 1mg; Iron 20mg; manganese 40mg; Selenium 0.2mg; Zinc 30mg; Antioxidant 1.2mg; ME = Metabolisable Energy, mp = methiorep

RESULTS AND DISCUSSION

The results of the effect of herbal methionine (Methiorep®) as a substitute for synthetic methionine on growth performance of broiler chicks (1-4weeks) and broiler finishers (5-8weeks) are presented in Table 3 and 4 respectively. The results show that body weight gain, average feed intake and FCR during starter and finisher phases were not significantly ($P>0.05$) influenced by the dietary treatments. Significant difference ($P<0.05$) was however observed on cost per kg feed. The cost per kg feed decreased as the level of methiorep increased in the diets.

The observations on feed intake, body weight gain and FCR of broiler chickens in this study showed that supplementing broiler diets with methiorep in place of methionine had no adverse effect on growth performance of birds. The overall growth performance of birds fed SM diet was significantly similar to those fed methiorep diets. This result agrees with the report of Kalbande *et al*. (2009) who observed no significant difference in the performance of broilers fed herbal methionine vs synthetic methionine diets. The decrease in the cost of feed per kg as the methiorep increased in the diets is a reflection of the cheaper price of methiorep as compared with methionine in the market.

Table 5 shows the effect of methiorep as substitute for methionine on carcass characteristics of broiler chickens. There were no significant differences ($P>0.05$) in all the parameters measured across the treatment groups. Birds fed methionine diets were significantly comparable with those fed methiorep diets in all the carcass parameters measured.

The similarity in the results of carcass parameters measured across the treatment groups is a true reflection of the body weight performance indices and that of tissue development. This indicates that the nutrients supplied by both methionine and methiorep diets were adequate and met the nutrients required by broilers for efficient meat production that were similar. The cut-up parts such as drumstick, thigh and wing weight (expressed as percentage of live weight) of birds fed methionine and methiorep diets followed the performance pattern of the body weight development. Earlier studies by Chattopadhyay *et al.* (2006) and Kalbande *et al.* (2009) revealed similarity in the carcass parameters of broilers fed Synthetic methionine and herbal methionine (Methiorep) diets.

Table 3. Effect of Herbal methionine (Methiorep®) as a substitute for synthetic methionine on growth performance of broiler chicks (1-4weeks)

Parameters	0%mp	25%mp	50%mp	75%mp	100%mp	SEM	P
Initial weight (g/b)	100.67	100.58	100.72	100.74	100.66	0.09	NS
Final weight (g/b)	445.27	446.92	445.66	447.04	447.97	1.36	NS
Total wt. gain (g/b)	344.60	346.34	344.94	346.30	347.31	1.35	NS
Daily wt gain (g/b/d)	16.41	16.49	16.43	16.49	16.54	0.07	NS
Total feed intake (g/b)	1035.00	1061.67	1059.75	1075.63	1099.00	33.01	NS
Daily feed intake (g/b/d)	49.29	50.56	50.46	51.22	52.33	1.53	NS
FCR	3.00	3.07	3.07	3.11	3.16	0.09	NS
Cost of feed/kg weight (₦)	245.47	244.89	245.70	245.13	246.00	0.44	NS
Cost per Kg feed (₦)	100.85[a]	98.45[a]	96.23[ab]	94.20[b]	92.89[b]	1.99	*

Mp= methiorep. SEM= standard error of mean. ab Means on the same row with different superscripts are significantly (P<0.05) different . ***** Significant difference (p<0.05). NS= Non significant difference (p>0.05).

Table 4. Effect of Herbal methionine (Methiorep®) as a substitute for synthetic methionine on growth performance of finisher broilers (5-8weeks)

Parameters	0%mp	25%mp	50%mp	75%mp	100%mp	SEM	P
Initial weight (g/b)	445.27	446.92	445.66	447.04	447.97	1.36	NS
Final weight (g/b)	1988.08	1983.30	1950.00	1950.37	1946.72	21.68	NS
Total wt. gain (g/b)	1542.81	1536.38	1504.34	1503.33	1498.75	21.03	NS
Daily wt gain (g/b/d)	55.10	54.87	53.73	53.69	53.53	0.79	NS
Total feed intake (g/b)	3622.51	3613.30	3705.00	3802.51	3860.00	124.35	NS
Daily feed intake (g/b/d)	129.38	129.05	132.32	135.80	137.86	4.44	NS
FCR	2.35	2.35	2.46	2.53	2.56	0.11	NS
Cost of feed/kg weight (₦)	314.45	313.17	313.42	314.40	313.58	0.67	NS
Cost per Kg feed (₦)	102.15[a]	101.52 [a]	99.36 [ab]	98.45 [b]	96.75 [b]	1.71	*

Mp= methiorep. SEM= standard error of mean. ab Means on the same row with different superscripts are significantly (P<0.05) different . ***** Significant difference (p<0.05). NS= Non significant difference (p>0.05).

Table 5. Effect of Herbal methionine (Methiorep®) as a substitute for synthetic methionine on Carcass characteristic of broiler chickens (1-8weeks)

Parameters	0%mp	25%mp	50%mp	75%mp	100%mp	SEM	P
Live weight, g	1800.00	1791.67	1816.67	1883.33	1800.00	45.85	NS
Bled weight, g	1733.33	1650.00	1754.04	1781.29	1702.01	66.67	NS
Dressed wt, g	1683.30	1591.70	1691.72	1706.71	1651.00	58.01	NS
Carcass wt, g	1300.00	1366.71	1416.69	1450.00	1354.10	75.02	NS
Dressing %	72.17	70.20	76.12	76.87	75.05	3.35	NS
Back wt, %	15.29	13.17	13.97	13.21	12.45	1.44	NS
Breast wt, %	19.44	17.84	17.95	17.72	17.76	0.87	NS
Thigh wt, %	6.93	5.59	5.51	7.80	7.30	1.16	NS
Wings, %	5.59	5.63	4.98	5.01	5.50	0.34	NS
Drumstick %	9.72	7.99	8.61	9.55	8.30	0.88	NS

Mp= methiorep. SEM= standard error of mean. ab Means on the same row with different superscripts are significantly (P<0.05) different . ***** Significant difference (p<0.05). NS= Non significant difference (p>0.05).

Table 6 shows the result of Organ weights of broiler chickens fed the experimental diets. There were no significant differences (P>0.05) in all the parameters measured across the treatment groups. Birds fed methionine diets were significantly comparable with those fed methiorep diets in all the parameters measured. The weight of different organs measured were not influenced (P>0.05) by the dietary treatments. The similarity in the values obtained on these organs indicate that there were no metabolic abnormalities among birds fed both methionine and methiorep diets. Chattopadhyay *et al.* (2006) reported that dietary supplementation of Herbal methionine significantly reduced abdominal fat pad. The difference in the result obtained in our study may be attributed to the quantity of methiorep used. The similarity in the values of spleen and other organs of implies that methiorep can be included in the diet of broilers and the immunity of the birds against disease guaranteed since spleen is the major source of lymphocytes and the storage site for white and red blood cells (Frandson, 1981; Hetland and Svihus, 2001).

The result of the effect of herbal methionine (Methiorep®) as a substitute for synthetic methionine on Haematological parameters of broiler chickens is presented in Table 7. Packed Cell Volume, Haemoglobin, White blood cell and Red blood cell were not significantly (P>0.05) influenced by dietary treatments.

Packed Cell Volume is beneficial in assessing the protein status and possibly forecasting the degree of protein supplementation at different physiological states (Daramola *et al.*, 2005). Keir *et al.* (1982) reported that reduced values of Packed Cell Volume is an indication of poor nutritional status and pointer to iron deficiency or nutritional anaemia. In this study, Methiorep did not visibly affect birds health, there were no clinical signs of any disease that may be attributed to the feed supplied. Non-significant differences were observed in virtually all the haematological variables determined for birds fed on diets supplemented with both Synthetic methionine and Herbal methionine. Rekhatel *et al.* (2010) had earlier reported that herbal methionine had no significant effect on haematological profiles of broiler chickens. This implies that dietary herbal methionine has no detrimental effect on health status of chickens. Rajurker *et al.* (2009) also reported that herbal methionine supplement (Methiorep®) is totally safe and has no adverse effect even when used at the highest limit dose of 5 g/kg body weight of male Wistar rats.

The result of the effect of herbal methionine (Methiorep®) as a substitute for synthetic methionine on serum biochemical indices of broiler chickens is presented in Table 8. There were no significant (P>0.05) differences in the values obtained for albumin, glucose, Total protein, urea and globulin. Total protein, albumin, globulin, urea and glucose concentrations observed in this study are within the normal range reported for chickens (Prabhakaran *et al.*, 1996). The similarity in these results agree with the reports of Halder and Roy (2007) and Rekhatel *et al.* (2010) who did not observe any significant effect of HM supplementation on serum biochemical indices concentrations of broiler chickens. However, the results obtained Total protein and Albumin in this study is contrary to the report of Igbasan *et al.* (2012) who observed significant difference when laying hens were fed diets supplemented with synthetic and herbal methionine.

Table 6. Effect of Herbal methionine (Methiorep®) as a substitute for synthetic methionine on Organ weight of broiler chickens (1-8weeks)

Parameters	0%mp	25%mp	50%mp	75%mp	100%mp	SEM	P
Gizzard,%	2.51	2.46	2.58	2.60	2.01	0.30	NS
Heart, %	0.39	0.34	0.35	0.41	0.36	0.05	NS
Lungs, %	0.33	0.28	0.38	0.44	0.26	0.26	NS
Liver, %	1.41	1.89	1.11	1.98	1.38	0.45	NS
Spleen, %	0.90	0.98	0.97	0.95	0.92	0.70	NS
Intestinal wt, %	3.65	3.18	3.49	3.98	3.02	0.50	NS
Abdominal fat, %	1.88	1.79	1.76	1.80	1.84	0.50	NS

Mp= methiorep. SEM= standard error of mean. ab Means on the same row with different superscripts are significantly (P<0.05) different . ***** Significant difference (p<0.05). NS= Non significant difference (p>0.05).

Table 7. Effect of Herbal methionine (Methiorep®) as a substitute for synthetic methionine on Haematological parameters of broiler chickens (1-8weeks)

Parameters	0%mp	25%mp	50%mp	75%mp	100%mp	SEM	LOS
Packed Cell Volume, %	30.20	30.24	28.54	28.61	28.70	0.78	NS
Haemoglobin, g/dl	10.07	10.08	9.53	9.87	9.90	0.29	NS
White Blood Cell, X^6/l	77.19	76.15	77.86	76.48	76.48	0.70	NS
Red Blood Cell, X^{12}/l	6.26	6.38	6.43	6.13	6.46	0.18	NS

Mp= methiorep. SEM= standard error of mean. ab Means on the same row with different superscripts are significantly (P<0.05) different . LOS= Level of significance ***** Significant difference (p<0.05). NS= Non significant difference (p>0.05).

Table 8. Effect of Herbal methionine (Methiorep®) as a substitute for synthetic methionine on Serum biochemical indices of broiler chickens (1-8weeks)

Parameters	0%mp	25%mp	50%mp	75%mp	100%mp	SEM	LOS
Total protein, g/dl	4.47	4.44	4.52	4.19	4.42	0.18	NS
Albumin, g/dl	2.11	2.54	2.52	2.07	2.42	0.25	NS
Globulin, g/dl	2.36	1.98	2.00	2.12	2.00	0.20	NS
Glucose, g/dl	77.88	78.96	78.35	77.35	79.91	1.30	NS
Urea, mg/dl	13.17	13.09	14.29	14.40	14.05	0.67	NS

Mp= methiorep. SEM= standard error of mean. ab Means on the same row with different superscripts are significantly (P<0.05) different . LOS= Level of significance ***** Significant difference (p<0.05). NS= Non significant difference (p>0.05).

CONCLUSION

From the result of this study, it can be concluded that herbal methionine (Methiorep) can partially or completely substitute for Synthetic methionine in the diets of both starter and finisher broilers without adverse effect on growth performance, carcass yield and blood profiles of birds.

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