ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

International Journal of Poultry Science 9 (8): 809-812, 2010
ISSN 1682-8356

Evaluation of Methiorep as a Substitute for Methionine in Broiler Diets

Itoe Salome[1], I.I. Dafwang[2] and G.S. Bawa[1]
[1]Department of Animal Science, [2]National Agricultural Extension and Research Liason Services,
Ahmadu Bello University, Zaria, Nigeria

Abstract: A total of 225 day old broiler chicks were used to evaluate the use of Methiorep, a herbal Methionine product, as a substitute for synthetic Methionine in broiler diets. The experiment lasted from 0-4 weeks of age. The birds were randomly allocated to 5 dietary treatments in 3 replicates of 15 birds each, giving a total of 45 birds per treatment. The 5 dietary treatments comprised diet 1 which was devoid of supplementary Methionine and Methiorep, diet 2 had 0.25% Methionine, while diets 3-5 had graded levels of 0.25, 0.5 and 1% Methiorep respectively. All diets were isocaloric and isonitrogenous. The results showed that birds fed the Methionine supplemented diet performed significantly ($p<0.05$) better than other treatments in body weights, weight gains, feed intake, feed to gain and feed cost per kg gain. Dietary treatments had no significant effect on mortality rate. An analysis of the effect of graded levels of Methiorep on growth performance showed that Methiorep significantly improved growth performance up to 1% inclusion level but growth performance even at that level was inferior to that obtained on the 0.25% Methionine supplemented diet. It is concluded from this experiment that Methiorep is not an effective substitute for Methionine under the conditions of this study.

Key words: Methionine, methiorep, herbal methionine, broiler chicks

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 investigators 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} metabolism (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 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).

The major sources of Methionine in diets formulated from conventional feedstuffs are vegetable proteins such as groundnut cake and soybeans meal which contain inadequate amounts. Among the vegetable proteins, sesame has the highest content of methionine but its use as an alternative to synthetic Methionine has not been well documented. Animal proteins contain adequate amounts of Methionine but are often too expensive for use in practical rations (Dafwang *et al*., 1980, 1983; Dafwang, 2006). The authors concluded that the Methionine requirements of broilers in Nigeria could be met by supplementing with DL Methionine or the use of animal protein sources. Recent reports have also shown that there are other natural alternative supplements developed to replace synthetic Methionine for maintaining animal performance and well being.

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

Corresponding Author: I.I. Dafwang, National Agricultural Extension and Research Liason Services, Ahmadu Bello University, Zaria, Nigeria

Methionine. It is reported to contain SAMe(S-Adenosyl Methionine) and phosphatidyl choline. SAMe is known to be a lipotropic agent, methyl donor and precursor of homocysteine (Animal Care Service Konsult, 2008).

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). Thus study was conducted to determine the nutritional value of Methiorep as a substitute r synthetic methionine in broiler starter diets in the Nigerian environment.

MATERIALS AND METHODS

Experimental birds: Two hundred and twenty five (225) day old broiler chicks purchased from a commercial hatchery, were used for the experiment. The birds were randomly allocated to 5 dietary treatments in 3 lots of 15 birds per replicate in a completely randomized design and housed in pens under the deep litter system. The birds were managed in accordance with the standard procedures for broiler rearing in the Animal Science Department of Ahmadu Bello University.

Experimental diets: The 5 dietary treatments comprised diet 1 which was devoid of supplementary Methionine and Methiorep, diet 2 had 0.25% Methionine, while diets 3-5 had graded levels of 0.25, 0.5 and 1% Methiorep respectively. All diets were isocaloric and isonitrogenous (Table 1) and formulated to meet the requirements for energy, protein, calcium, phosphorus and Methionine that have been established for broiler chicks in Nigeria (Olomu, 1995; Dafwang, 2006). The broiler starter diets were fed from 0-4 weeks of age. Feed and water were given *ad libitum*.

Parameters measured: At the beginning of the experiment, the day old chicks were randomly allocated to the five dietary treatments on the basis of equal weights and thereafter weighed weekly. Weights obtained were subtracted from the previous ones to get weekly weight gain. The cumulative weight gain and feed consumption were computed and used to calculate the feed efficiency and feed cost per kilogram weight gain. Mortality was monitored daily and recorded.

Statistical analysis: Data obtained from the experiment was subjected to Analysis of Variance, using the SPSS package version 15 (SPSS 2008). Significant levels of differences among means were determined by using the Duncan Multiple Range Test, in the SPSS package.

Table 1: Composition of broiler starter diets

	Treatments				
Feedstuff	1	2	3	4	5
Maize	55.25	55.00	55.00	54.75	54.25
Groundnut cake	36.00	36.00	36.00	36.00	36.00
Blood meal	3.00	3.00	3.00	3.00	3.00
Palm oil	2.00	2.00	2.00	2.00	2.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Methionie	0.00	0.25	0.00	0.00	0.00
Methiorep	0.00	0.00	0.25	0.50	1.00
Total	100.00	100.00	100.00	100.00	100.00
Calculated analysis					
ME (Kcal/kg)	3036.10	3033.00	3033.00	3018.90	3001.70
Crude protein (%)	23.12	23.10	23.10	23.08	23.03
Ether extract (%)	4.14	4.13	4.12	4.12	4.11
Crude fiber (%)	3.21	3.20	3.20	3.18	3.12
Phosphorus (%)	0.82	0.82	0.82	0.82	0.82
Lysine (%)	1.17	1.17	1.17	1.17	1.17
Calcium (%)	1.26	1.26	1.26	1.26	1.26
Methionine (%)	0.30	0.55	0.30	0.30	0.30
Methionine + Methiorep (%)	0.30	0.55	0.55	0.80	1.30

Vitamin-mineral premix provide per kg of diet: vit. A, 13,340 i.u; vit. D_3, 2680 i.u; vit, E, 10 iu; vit. K, 2.68 mg; calcium pantothenate, 10.68; vit. B_{12}, 0.022 mg; folic acid, 0.668 mg; choline chloride, 400 mg; chlorotetracycline, 26.68 mg; manganese, 13 mg; iron 66.68 mg; zinc, 53.34 mg; copper, 3.2 mg; iodine, 1.86 mg; cobalt, 0.268 mg; selenium, 0.108 mg

Table 2: Performance of broiler chicks from 0-4 weeks

	Treatments (% Methionine or methiorep)						
	1	2	3	4	5		
Parameter	0.0	0.25	0.25	0.5	1	SEM	LOS
Initial body weight (g)	49.89	50	49.89	50	50		
Final weight (g)	506.67^{d}	860.97^{a}	525.57^{cd}	575.57^{bc}	613.27^{b}	35.05	*
Weight gain (g)	456.77^{d}	810.97^{a}	475.67^{cd}	525.57^{bc}	363.27^{b}	35.04	*
Feed consumed (g)	903.03^{c}	1360.63^{a}	1200.80^{b}	1133.37^{b}	1242.20^{ab}	43.28	*
Feed/gain ratio	1.98^{b}	1.69^{c}	2.52^{a}	2.17^{b}	2.21^{b}	0.08	*
Feed cost/kg gain (Naira)	104.14^{b}	94.32^{b}	139.57^{a}	125.76^{a}	139.76^{a}	5.29	*
Mortality (%)	2.22	2.22	2.47	0	6.67	1.1	NS

^{abc} = Means with different superscript on the same row differ significantly ($p<0.05$). NS = Not Significant ($p>0.05$); SEM = Standard Error of Mean; LOS = Level of Significance; * = Significant at $p<0.05$

Table 3: Performance of broiler chicks fed graded levels of Methiorep

	Treatments (% Methiorep)					
	1	2	3	4		
Parameter	0	0.25	0.5	1	SEM	LOS
Initial body weight (g)	49.89	49.89	50	50		NS
Final weight (g)	506.67^{b}	525.57^{b}	575.57^{a}	613.27^{a}	35.05	*
Weight gain (g)	456.77^{b}	475.67^{b}	525.57^{a}	363.27^{a}	35.04	*
Feed consumed (g)	903.03^{b}	1200.80^{a}	1133.37^{a}	1242.20^{a}	43.28	*
Feed/gain ratio	1.98^{b}	2.52^{a}	2.17^{b}	2.21^{b}	0.08	*
Feed cost/kg gain (Naira)	104.14^{b}	139.57^{a}	125.76^{a}	139.76^{a}	5.29	*
Mortality (%)	2.22	2.47	0	6.67	1.1	NS

^{abc} = Row Means with different superscripts are significantly different ($p<0.05$); NS = Not Significant ($p>0.05$); SEM = Standard Error of Mean; LOS = Level of Significance, * = Significant at $p<0.05$

RESULTS AND DISCUSSION

The result of the effect of Methionine/Methiorep supplementation is as shown in Table 2. The performance of broiler chicks fed 0.25% supplementary Methionine was superior to the control and Methiorep treatments. The chicks fed 0.25% Methionine had higher feed intake, better feed/gain ratio and consequently higher body weight and weight gain at lower feed cost/kg gain. The observed increase in body weight and weight gain of chicks with Methionine supplementation is similar to the findings of Chattopadhyay *et al*. (2006) and Kalbande *et al*. (2009). The increase in body weight and weight gain is attributed to the potential role of Methionine in promoting growth. However, the high feed intake of this diet was contrary to the findings of Garlich (1985); Chattopadhyay *et al*. (2006) and Halder and Roy (2007) who reported significantly ($p<0.05$) higher feed intake on the control treatment over others. The better feed/gain ratio of the methionine supplemented diet over other treatments is in agreement with the findings of other workers (Garlich, 1985; Bertram *et al*., 1991; Chattopadhyay *et al*., 2006). The cost per kg weight gain was significantly ($p<0.05$) better for the methionine supplemented diet.

The treatments containing graded levels of Methiorep supplementation were separated and subjected to analysis of variance (Table 3). There was significant ($p<0.05$) difference in performance of birds fed Methiorep over that of the control diet. The performance of the chicks increased with increase in level of Methiorep in terms of body weight and weight gain and feed conversion efficiency. This is in agreement with the reports of Chattopadhyay *et al*. (2006), Halder and Roy (2007) and Kalbande *et al*. (2009). The increase in weight gain appears not to have peaked even at 1% level of inclusion of Methiorep and yet even at that level, growth performance was less than that of 0.25% methionine supplemented diet. The high feed cost per kg gain across the Methiorep treatments shows significant increase in the cost of producing one kilogram of weight. This could also be due to the high feed consumed that yielded no corresponding increase in weight gain, coupled with relatively high feed to gain ratio of the birds.

Conclusion: The results obtained from this study showed that growth performance on Methiorep supplemented diets were significantly inferior to the Methionine supplemented diet even at levels of up to 1% dietary supplementation with Methiorep is not an effective substitute for Methionine under the conditions of this study.

REFERENCES

Animal Care Konsult, (Nig) Limited. Http: www.animalcare-ng.com, 2008.

Bender, D.A., 1975. Amino acid metabolism. John Wiley and Sons Ltd., Great Britain.

Bertram, H.L., E.J. Van Weerden and J.B. Schutte, 1991. DL-methionine and DL-methionine hydroxy analogue compared: There is a difference in biological activity in broiler diets. Misset World Poult., 7: 13-15.

Chattopadhyay, K., M.K. Mondal and B. Roy, 2006. Comparative efficacy of DL-methionine and herbal methionine on performance of broiler chicken. Int. J. Poult. Sci., 5: 1034-1039.

Chen, F.S.L., P.E. Noll Waibel and D.M. Hawkins, 1993. Effect of collate, vitamin B_{12} and choline supplementation on turkey breeder performance. Poult. Sci., pp: 72-73.

Dafwang, I.I., S.A. Offiong and J.M. Olomu, 1980. The effect of replacing fishmeal with bloodmeal in broiler finisher rations. Nig. J. Anim. Prod., 7: 81-86.

Dafwang, I.I., S.A. Offiong and J.M. Olomu, 1983. The value of blood meal as a dietary substitute for fishmeal in broiler starter rations. Nig. J. Anim. Prod., 10: 60-67.

Dafwang, I.I., 2006. Meat, milk and eggs from farm wastes: Explorations in Animal Nutrition Research and Extension. An inaugural lecture: ABU, organized lectures committee. Vice Chancellor's Office, Ahmadu Bello University, Zaria, Nigeria.

Fancher, B.L. and L.S. Jensen, 1989. Influence on performance of 3-6 wks old broilers of varying dietary protein content with supplementation of essential amino acid requirements. Poult. Sci., 68: 113-123.

Garlich, J.D., 1985. Pesponse of Broilers to DL-Methionine hydroxyl analogue free acid, DL-Methionine and L-Methionine. Poult. Sci., 64: 1541-1584.

Halder, G. and B. Roy, 2007. Effect of herbal or synthetic methionine on performance, cost benefit ratio, meat and feather quality of broiler chicken. Int. J. Agric. Res., 2: 987-996.

Kalbande, V.H., K.S. Ravikanth, Maini and D.S. Rekhe, 2009. Methionine supplementation options in poultry. Int. J. Poult. Sci., 8: 588-591.

North, M.O. and D.D. Bell, 1990. Commercial chicken production manual. 4th edition.

Olomu, J.M., 1995. Monogastric Animal Nutrition, Principles and Practise. Published by JACHEM.

Statistical Packages for Social Sciences (SPSS), 2008. SPSS version 15. http//www.spss.