EVALUATING THE EFFICACY OF METHIONINE SUPPLEMENTATION OPTIONS IN COMMERCIAL BROILER CHICKENS

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INTRODUCTION
Methionine is the first limiting essential amino acid in maize and soybean-based diets (Fancher and Jensen, 1989) for poultry. Methionine plays a significant role in energy production and protein synthesis. It enhances production and size of the eggs, overall growth of the bird, feed conversion ratio (FCR), and livability of broilers and layers (Aerni et al., 2005; Binder, 2003). Chickens are unable to synthesize methionine in amounts necessary to sustain life and growth. Usually, large amounts of vegetable protein supplements are used in feeds, with low levels of animal and fish as protein source (North and Bell, 1990). Hence, it is necessary to add methionine to meet the bird’s requirement, whether synthetic or herbal source. Synthetic methionine is metabolized into highly toxic compounds such as methylpropionate, thereby, adversely affecting the performance of the birds (Bender, 1975). Keeping the above facts in mind, the present feeding trial was conducted to evaluate the efficacy of poly-ingredient formulation, Him-Methio (manufactured by The Himalaya Drug Company, Makali, Bangalore) as an alternative to synthetic methionine.

MATERIALS AND METHODS
A total of 3000 one-day-old unsexed broiler chicks of VenCobb strain were randomly divided into three equal groups of 1000 each: one control (T₀) and two treatment groups (T₁ and T₂). The birds were fed with broiler starter and broiler finisher (maize and soybean-based diet) in mash form. Standard managerial and nutritional practices were followed except for the treatment given in deep litter rearing system. In the control group, basal diet without methionine supplementation; in T₁ group, basal diet supplemented with DL-methionine at 1 kg/tonne of feed; and in T₂ group, basal diet supplemented with Him-Methio at 1 kg/tonne of feed, were fed to chicks for 42 days. The trial was conducted at Karuna Poultry Farm, Devanahalli, Bangalore rural district, India.

Nutritional analysis of diets was done in compliance to AOAC (1995) standards. Chicks were vaccinated against Ranikhet and infectious bursal diseases on the 7th and 14th days of their lives, respectively. Individual body weight and feed consumption of broilers from all the three groups were recorded on days 0, 7, 14, 21, 28, 35, and 42 of their lives. Mortality in each group was recorded on a daily basis. At the end of the study, “Production Efficiency Factor” (PEF) was calculated to compare the live-bird performance of the flocks. Factors such as live weight, age, livability, and feed conversion efficiency are taken into consideration for PEF, which gives a reasonable idea of the overall technical efficiency. PEF can be calculated from the following equation:
Livability % x Mass (kg)
PEF = ------------------------------- x 100
FCR x Age (in days)

Statistical analysis of the data was done by “one-way ANOVA” followed by “Bonferroni's Multiple Comparison Test” (GraphPad Prism software, San Diego, California, USA).

RESULTS AND DISCUSSION
Proximate analysis of the basal diet yielded 23.5% and 20.35% crude protein with a metabolizable energy content of ration 2800.5 and 2906.2 kcal/kg for broiler starter and finisher, respectively. At the end of the 42nd day, the average cumulative body weight (g) of chicks in T0, T1, and T2 groups were 1879, 2089, and 2222 g, respectively (Table 1 and Figure 1). The chicks in T2 group showed a significant (p<0.01) gain in body weight (increase of 343 g) as compared to the chicks in T0 group and numerically higher weight gain (increase of 133 g) as compared to the chicks in T1 group.

Feed consumption of the chicks was recorded at weekly intervals throughout the period of the trial. The total average feed consumption per bird ranged from 3.795 to 4.262 kg during the experimental period of 42 days. For 0 to 6 weeks of age, the average feed consumption per bird per day (g) was 90.5, 95.23, and 103.57 g for T0, T1, and T2, respectively. The cumulative FCR values were 2.02, 1.91, and 1.95 for T0, T1, and T2, respectively (Figure 2), without any significant differences between the three groups. The results of the trial showed that the chicks in T2 group consumed more feed and gained more body weight as compared to the chicks in T1 group.

According to different studies (Ozturkan et al., 1993; Simone et al., 1995), addition of methionine to the diet of broiler chicks improves their performance in terms of body weight gain and feed conversion efficiency.

Livability of the chicks was 99%, 100%, and 100% (Figure 3) for T0, T1, and T2 groups, respectively without any significant differences between the three groups. Results of the trial showed that the Him-Methio supplement in T2 group had no detrimental effects on the livability of chicks.

PEF facilitates the comparison of performance within and among the groups and can also be used to assess environmental, climatic, and managemental variables. PEF values of 219.26,
260.41, and 271.06 were calculated for T₀, T₁, and T₂ groups, respectively (Figure 4). A flock with acceptable growth and livability parameters should attain 200 to 225 PEF values.

The results of the trial are in accordance with the findings of Chattopadhyay et al., (2006) and Kalbande et al., (2009). Both the studies showed that the herbal source of methionine can replace DL-methionine in the diet of commercial broiler chicks. The beneficial effects of Him-Methio could be due to the individual or synergistic action of the ingredients in the product formulation.

![Figure 1. Average weekly body weight (g)](image1)

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![Figure 2. Feed Conversion Efficiency](image2)

**Figure 2. Feed Conversion Efficiency**

![Figure 3. Livability %](image3)

**Figure 3. Livability %**

![Figure 4. Production Efficiency Factor](image4)

**Figure 4. Production Efficiency Factor**

**CONCLUSION**

The chicks fed on basal diet supplemented with Him-Methio showed a significant gain in body weight and lower FCR values as compared to the chicks fed only on basal diet. Hence, the study concludes that 1 kg Him-Methio per tonne of feed can efficiently replace 1 kg synthetic DL-methionine per tonne of feed to improve commercial broiler flock performance (growth, FCR, and livability parameters).
References