# BROILER'S PERFORMANCES FED COMERCIAL DIET SUPPLEMENTED WITH LIQUID METHIONINE ANALOGUE (LMA)

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## CONTENTS

# BROILER'S PERFORMANCES FED COMERCIAL DIET SUPPLEMENTED WITH LIQUID METHIONINE ANALOGUE (LMA)

**Abstract**

The objectives of this study were to study methionine and aflatoxin status of three different commercial poultry diets used in Indonesia (W, P, C); and to study the efficacy of Liquid Methionine Analogue (LMA) produced by Sumitomo Chemical. Co, Ltd Japan in improving broilers performances fed the three commercial diets. The experiment used 3600 of DOC of Cobb strain broilers which divided into 9 groups and assigned randomly to one of three treatments of commercial diets (W, P, and C). The diet treatments were : (1) commercial diet without LMA in drinking water; (2) commercial diet with 0.05% of LMA in drinking water; and (3) commercial diet with 0.10% of LMA in drinking water. Diets and water were offered *ad libitum* during 6 weeks. Parameters observed were broilers performances (water and feed intake, body weight gain, final body weight, feed conversion ratio) and histology of intestine. The performances data were analysed using analyses of variance (ANOVA) and histology data were observed descriptively.
The results showed that nutrients content of the three commercial diets was in variation, especially for amino acids. There was a difference in aflatoxin status of the three commercial diets and the W-diet had the highest aflatoxin in term of G1 and G2. Supplementation of LMA at the level of 0.05 and 0.10 % in the drinking water did not affect the broilers performances. However there was a tendency that supplementation of 0.10% LMA in the drinking water could inprove the performances, and supplementation of 0.10% LMA was the optimum level.

Keywords: commercial diet, liquid methionine analogue, broiler

## INTRODUCTION

Poultry nutritionists and producers have recognize that there are some variation in nutrients content of feedstuffs used in the feed mills as well as the poultry farmers. This situation leads to variation in using the amount of same ingredients in the diet's formula produced by the different feed mills to meet the nutrients requirement of the poultry, such as methionine. The quality of amino acids, including methionine contained in the ingredients can be different due to that variation.

Another problem faced by the poultry producers is that aflatoxin contained in the feedstuffs, and there are some pathogenic bacteria in water, feedstuffs, and air. These can reduce the nutritive value of the diet fed by the poultry, and thus can interfere the growth of the poultry.

To overcome these problems, supplementation of methionine is needed. The study describes the efficacy of supplementation of liquid methionine analogue (LMA) produced by Sumitomo Chemical Co, Ltd Japan in commercial diets.

Objectives:

1. To study methionine and alfatoxin status of three different commercial poultry diets
2. To study the efficacy of supplementation of Sumitomos Liquid methionine in improving performances of broilers fed commercial diets
3. To study histology of intestine of broilers fed commercial diets supplemented with liquid methionine

# METHODOLOGY

## Location

The feeding trials were conducted at W-group farm in Cibatok Bogor, Indonesia. The trials were carried out from July 3 to August 2008.

## Materials

Three thousand and six hundred of one day old chicks (DOC) of Cobb strain were purchased from PT. W-Bogor. Commercial diets were purchased from three different feed Industries those famous in Indonesia i.e.: W, P, and C. The chicks were kept in colony cages and there were feeders and drinkers in each cage.

## Methods

### *Feeding Trials*

Three thousand and six hundred of DOC were divided into 9 groups and assigned randomly to one of three treatments of commercial diets (W, P and C). The diet treatments were (1) Commercial diet without LMA in drinking water (2) Commercial diet with 0.05% of LMA in drinking water; (3) Commercial diet with 0.10% of LMA in drinking water. Diets and water were offered *ad libitum*. Once a week, the chicks were Individually weighted. Feed intake and feed conversion ratio were calculated weekly. At the end of the experiment, two broilers of each group were slaughtered to evaluate the weight percentage of abdominal fat, eviscerated and carcass as well as histology of intestine.

### *Statistical Analysis*

The data from completely randomized design of this feeding trials were analyzed statistically using analyses of variance (ANOVA) according to procedure of SAS.

## RESULT AND DISCUSSION

### Chemical composition and aflatoxin content of commercial diets

Nutrients content of the three commercial diets was in variation, especially for amino acids (Table 1). There was a difference in aflatoxin status of the three commercial diets and the W-diet had the highest aflatoxin in term of G1 and G2.

Table 1. Nutrients content of commercial diets

| Nutrient | Treatment diets | | |
|---|---|---|---|
| | W | P | C |
| | | | |
| Dry Matter (%) | 87.00 | 88.57 | 88.60 |
| Ash (%) | 5.94 | 6.10 | 5.20 |
| Crude Protein (%) | 21.75 | 22.50 | 22.49 |
| Crude Fiber (%) | 3.55 | 2.94 | 3.47 |
| Ether Extract (%) | 6.95 | 7.92 | 3.53 |
| Nitrogen Free Extract (%) | 48.81 | 49.11 | 53.91 |
| Ca (%) | 0.52 | 1.04 | 1.17 |
| P (%) | 0.52 | 0.44 | 0.51 |
| NaCl (%) | 0.29 | 0.37 | 0.42 |
| Gross Energy (kcal/kg) | 3987.00 | 4084.00 | 4012.00 |
| Aspartic acid (%) | 2.03 | 1.79 | 1.95 |
| Glutamic acid (%) | 4.16 | 3.55 | 3.97 |
| Serine (%) | 1.17 | 1.01 | 1.10 |
| Histidine (%) | 0.55 | 0.47 | 0.52 |
| Glysine (%) | 1.48 | 1.00 | 1.20 |
| Threonine (%) | 0.95 | 0.78 | 0.82 |
| Arginine (%) | 1.46 | 1.24 | 1.35 |
| Alanine (%) | 1.50 | 1.11 | 1.31 |
| Tyrosine (%) | 0.85 | 0.75 | 0.86 |
| **Methionine (%)** | **0.45** | **0.44** | **0.49** |
| Valine (%) | 1.05 | 0.85 | 0.94 |
| Phenilalanine (%) | 1.14 | 0.97 | 1.05 |
| Isolcusine (%) | 0.89 | 0.77 | 0.83 |
| Leusine (%) | 2.15 | 1.72 | 1.95 |
| Lysine (%) | 1.37 | 1.21 | 1.20 |

Table 2. Aflatoxin content of commercial diets

| Treatment diets | Aflatoxin | | | | |
|---|---|---|---|---|---|
| | B1 | B2 | G1 | G2 | Total |
| | ppb | | | | |
| W | Tr | Tr | 5.17 | 8.25 | 13.42 |
| P | Tr | Tr | 2.25 | 3.72 | 5.97 |
| C | Tr | Tr | 4.03 | 3.13 | 7.16 |

*Effect of Liquid Methionine Analogue Supplementation on Broiler's Water Intake*

Supplementation of liquid methionine analogue (LMA) at the level of 0.05 and 0.1% in the drinking water did not influence water intake of broilers during starter period (0-21 days) as well as finisher period (22-42 days). The amount of water consumed by the broilers was normal according to Leeson and Summers (2005) that water intake of broilers during starter period (0-21 days) maintained at 32°C was about 2300 ml/bird, and that of during finisher period (22-42 days) was about 8064 ml/bird. Figure 1. shows the water intake of broilers during starter and finisher period.

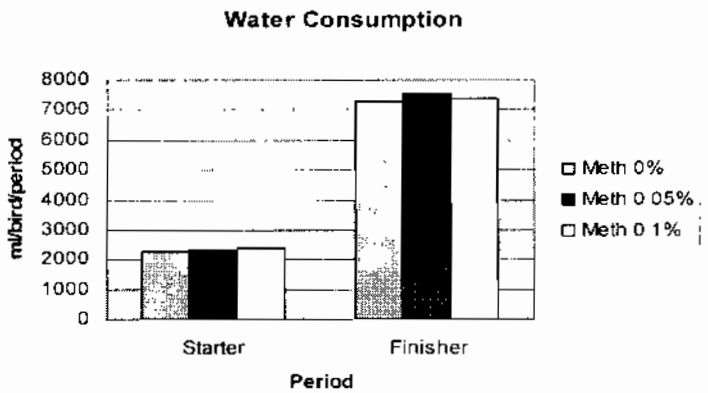


Figure 1. Water intake of broilers during starter and finisher period.

*Effect of Liquid Methionine Analogue Supplementation on Broiler's Feed Intake*

Supplementation of liquid methionine analogue (LMA) at the level of 0.05 and 0.1% in the drinking water along with commercial diets feeding tended to increase the feed consumption of broilers at starter age (0-21 days) up to 38%. Supplementation this LMA significantly affected the feed consumption of broilers at starter period with $P<0.1$. Figure 2. shows that there was no significant effect of supplementation of LMA on feed

intake of broilers fed the three commercial diets (W, P, C). Increasing in feed consumption due to supplementation of LMA in the starter age, it could be mild deficient of methionine in the diets. Leeson and Summers (2005) recommended that methionine requirement of broilers at starter period was 0.5%, while the methionine contained in the diets were 0.45, 0.44 and 0.49 for diets produced by W, P, and C, respectively. However, the methionine contained in the diets were meet the requirement of finisher broilers. Leeson and Summers (2005) recommended that methionine requirement of broilers at finisher period was 0.38%. Pesti *et al.* (2005) reported that when an amino acid deficient, the birds are likely to decrease their consumption if the deficiency is severe. Figure 2. shows the feed intake of broilers during starter and finisher period.

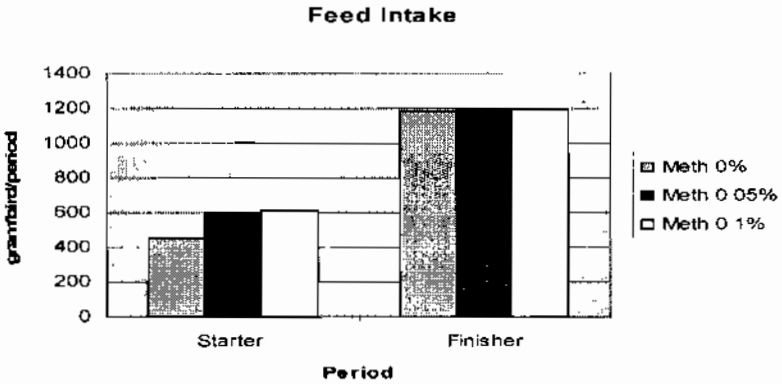


Figure 2. Feed intake of broilers fed the three commercial diets

*Effect of Liquid Methionine Analogue Supplementation on Broiler's Body Weight Gain*

Supplementation of liquid methionine analogue (LMA) at the level of 0.05 and 0.1% in the drinking water along with commercial diets feeding did not influence the body weight gain of broilers at starter period. Pesti *et al.* (2005) reported that mild deficiency of amino acid, growth rate may be normal and only feed efficiency decrease. Supplementation of LMA at the level of 0.1% tended to improve the body weight gain ($P<0.15$) of broilers at finisher period. Bunchasak et al (2006) reported that during the starter period, weigh gain of chick fed LMA were significantly heavier than chicks received methionine deficient diet ($P<0.01$), but the condition was not happened during grower period. Moreover, Bunchasak and Keawarun (2006) reported that the relative

bioefficacies of LMA between starter and grower periods may perhaps be different. The average body weight gain of broilers at starter and finisher period are shown in Figure 3.

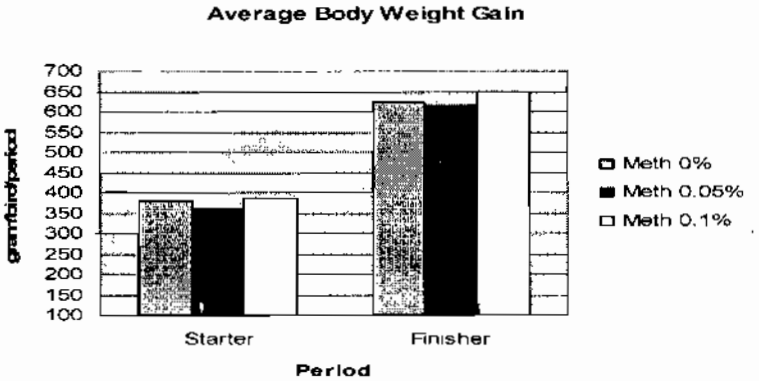


Figure 3. Body weight gain of broilers at starter and finisher period

*Effect of Liquid Methionine Analogue Supplementation on Broiler's Final Body Weight*

Supplementation of liquid methionine analogue (LMA) at the level of 0.1% in the drinking water along with commercial diets feeding tended to increase final body weight of broilers (42 days of age) ($P<0.1$). The result was supported by Zhang and Guo (2008) who reported that the body weight and feed intake were not significant different among graded level of LMA supplementation. The final body weight of broilers at starter and finisher period are presented in Figure 4.

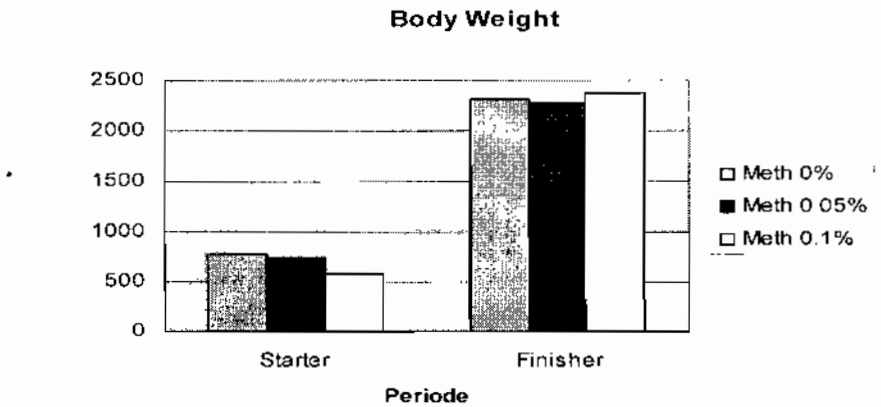


Figure 4. Body weight of broilers at starter and finisher period

*Effect of Liquid Methionine Analogue Supplementation on Broiler's Feed Conversion Ratio (FCR)*

Supplementation of liquid methionine analogue (LMA) at the level of 0.1% in the drinking water along with commercial diets feeding tended to decrease FCR (or increase feed efficiency) of the finisher period broilers. Café and Waldroup (2006) reported that the methionine level had no significant effect on feed conversion at 16 days of age, however at 35, 42 and 49 days of age, supplementation of methionine in the basal diet improved feed conversion. This result indicated that there was a mild deficient of methionine contained in the commercial diets, thus the broilers were responsive to LMA supplementation in the drinking water. Pesti *et al.* (1999, 2005) reported that mild deficiency of amino acid, growth rate may be normal and only feed efficiency decrease. Moreover, Daenner and Bessei (2003), and Lemme et al (2002) reported that LMA supplementation improved broilers performance. Figure 5. shows the effect of supplementation of LMA in the drinking water on feed conversion ratio of broilers.

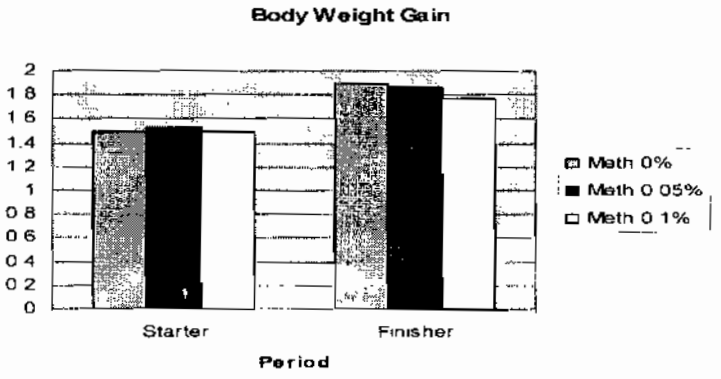


Figure 5. Effect of supplementation of LMA in the drinking water on feed convertion ratio of broilers

*Effect of Liquid Methionine Analogue Supplementation on Broiler's Carcass and Viscera*

The average of percentage of broilers carcass yielded in this experiment was about 70% of live weight (Figure 6). This result was similar to Leeson and Summers (2005) that the percentage of broiler carcass was 73% of live bird. Supplementation of liquid methionine analogue (LMA) at the level of 0.05 and 0.1% in the drinking water along with commercial diets feeding did not affect the carcass weight of the broilers. This result indicated that there was no severe deficient methionine in the commercial diets fed

to the broilers. Its just mild deficient of methionine in the commercial diets fed to the starter period broilers. The weight percentage of viscera of the broilers at 42 days of age were presented in Figure 7, Figure 8, and Figure 9.

Supplementation of liquid methionine analogue (LMA) at the level of 0.1% in the drinking water along with commercial diets feeding tended to decrease the weight percentage of duodenum, jejunum, ileum, and caecum. Its decreasing along with increasing of carcass weight percentation (Figure 6). This indicated that supplementation of LMA tended to increase meat synthesis of the broilers, although this effect statistically was not significant. Bunchasak et al. (2006) reported that dressing carcass increased and abdominal fat content decreased when various LMA were added although there were no significant differences. Statistically, the supplementation of LMA did not influence the percentage of all viscera.

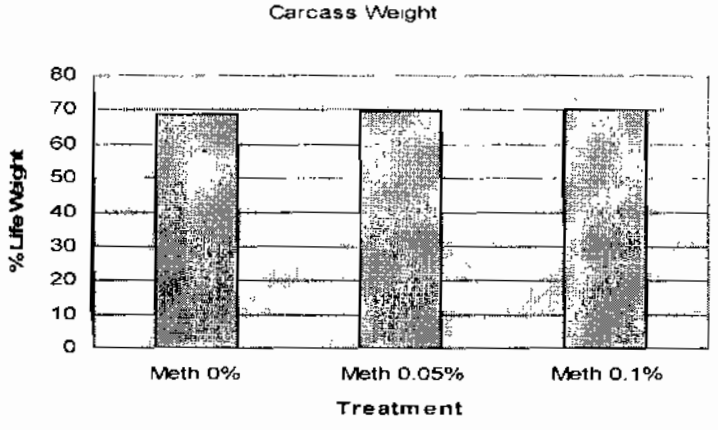


Figure 6. The average of percentage of broilers carcass yielded in this experiment was about 70% of live weight

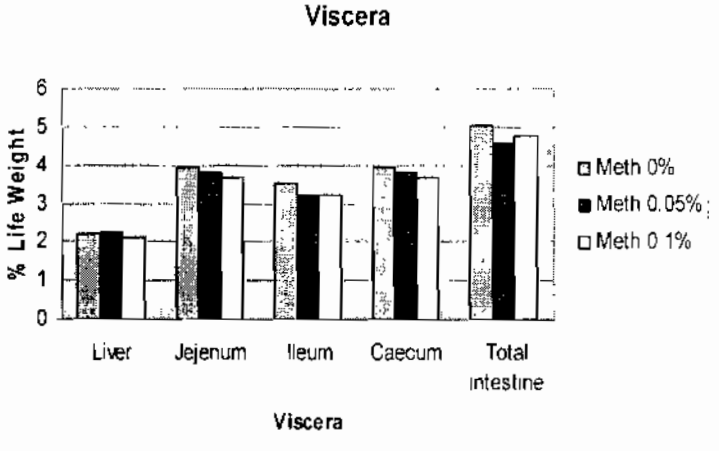


Figure 7. The weight percentage of viscera of the broilers at 42 days of age

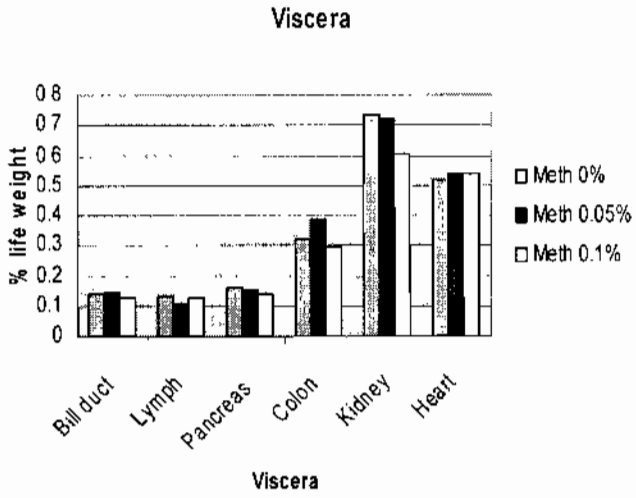


Figure 8. The weight percentage of viscera of the broilers at 42 days of age

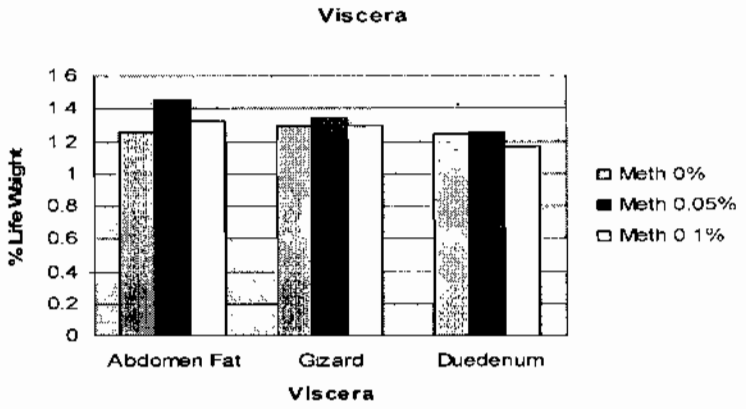


Figure 9. The weight percentage of viscera of the broilers at 42 days of age

*Effect of Liquid Methionine Analogue Supplementation on Histology of Broilers' Intestine*

Supplementation of 0.1% LMA in the drinking water along with W-diet feeding improved the intestine condition, i.e.; the villi was slim and long, and the goblet cells were increased (Figure 7). This condition is good to absorb nutrients efficiently.

## CONCLUSION.

Supplementation of LMA at the level of 0.05 and 0.10 % in the drinking water along with commercial diets feeding affected broilers performances, and supplementation of 0.10% LMA was the optimum level.

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