

**Econometric Feeding of Commercial Layers:  
Bioefficacy of Methionine Hydroxy Analogue Compared to DL-Methionine on  
Layers with Linear and Nonlinear Models**

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**ABSTRACT** Three experiments were conducted to determine the bioefficacy of methionine hydroxy analogue free acid (MHA) compared to DL-methionine (DLM) on commercial layers. Experiment 1 was designed for linear and nonlinear regression models to determine the bioefficacy of MHA compared to DLM. In this experiment, five graded supplemental levels (0.012, 0.024, 0.036, 0.048 and 0.060%) of methionine from DLM and MHA were added to a basal diet (containing 0.27% methionine) on equimolar basis. Regression analysis showed that bioefficacy on molar or weight basis respectively were 88.03% or 77.47% (egg production), 87.67% or 77.15% (egg mass) and 84.93% or 74.74% (egg weight) with an exponential model, and were 89.72% or 78.95% (egg production), 89.59% or 78.88% (egg mass) and 86.75% or 76.34% (egg weight) with a slope-ratio model. Experiment 2, a  $3 \times 2 \times 2$  factorial experiment, was designed to determine the sensitivity of bioefficacy comparison between DLM and MHA on layers. There were three protein levels (15.06%, 16.18% and 17.44%), two methionine levels (0.02% and 0.04%) and two methionine sources (DLM and MHA). The analysis of egg production and egg mass data showed that it was difficult to detect the difference between DLM and MHA if it exists, since no difference due to levels, which was supposed to be larger than the difference due to sources, was obtained. The analysis of egg weight data showed that a significant difference due to methionine levels was obtained, and the numerical difference due to methionine sources suggested that the

bioefficacy was below 100% on molar basis or 88% on weight basis. Experiment 3 was designed based on assuming 65% bioefficacy of MHA compared to DLM. In this experiment, five graded supplemental levels of methionine (0.012, 0.024, 0.036, 0.048 and 0.060%) were added to a basal diet, but MHA was calculated as 65%. The results showed that the bioefficacy of MHA was significantly higher than 65% ( $P < 0.05$ ) with egg production and egg mass as the criteria, and was not significant higher than 65% ( $P > 0.05$ ) with egg weight as the criterion.

**Key words: DL-methionine, methionine hydroxy analogue, bioefficacy, layer, regression model**