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“Development on the margin”

Effect of Microbial 6-phytase on Amino Acid-digestibility of Caectomised Laying Hens fed Low Lysine-based Diet

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Abstract

The study assessed the influence of a microbial 6-phytase on amino acid (AA) digestibility, N, P, Ca utilisation and interaction between phytase and lysine of caectomised laying hens fed lysine deficient diet. The experiment followed a 2×2 -factorial arrangement of treatments with two dietary levels of lysine (low: adequate; LLys: ALys) either without at 0 U/kg diet (Phy-) or with at 1000 U/kg diet (Phy+) phytase supplementation. The caectomised laying hens aged 28weeks were kept in balance crates and 7 individual hens were allocated to each treatment in two periods. Hens were fed the treatment diet for 10 days and excreta quantitatively collected during the last 5 days. The excreta were freeze dried and analyzed. The digestibility of amino acids ranged from 0.72 (glutamic acid) to 0.89 (methionine) in ALys Phy- diet and 0.77(lysine) to 0.94(serine) in ALys Phy+ diets; likewise, 0.55(lysine) to 0.90 (proline) in LLys Phy- diet and 0.80 (glutamic acid) to 0.93 (serine and proline) in LLys Phy+ diet. The digestion of lysine AA was numerically reduced by the low inclusion of lysine in LLys + phy- diet and only the digestibility of lysine was significantly ($p < 0.05$) improved of 17 analysed AA. A significant interaction between Lys \times Phy was only detected in lysine AA, but differences in the phytase effects were seen as the digestibility of all AA analysed both in ALys and LLys diets numerically increased. The difference in Mean Digestibility (MD) of AA between Phy+ and Phy- was 0.09 % -units in ALys and 0.08 % -units in LLys. Reduction of lysine in the LLys diets resulted to a depressed dry matter intake (DMI) with numerical improvement in N-utilisation but phytase supplementation was not significant ($p > 0.05$). The difference in MD of DMI was 1.4 % -units in ALys and 3.8 % -units in LLys. Phosphorus intake, P-excreted, P-retention, P-utilised and Ca-intake were only significantly ($p < 0.05$) affected by lysine level while phytase supplementation significantly ($p < 0.05$) affected P-retention and P-utilisation. Numerical reduction in P and Ca-excreted were observed in diets supplemented with phytase. Thus, the inclusion level of lysine in laying hen diet must be met for phytase to be effective.

Keywords: Amino acid digestibility, caectomised laying hens, lysine deficient diet, microbial phytase