

**Dietary supplementation with L-arginine and combinations of different oil sources
beneficially regulates body fat deposition, lipogenic gene expression, growth
performance and carcass yield in broiler chickens**

ABSTRACT

Context: Broiler meat with excessive of fat and saturated fatty acids content has serious health implication for consumers. The accumulation of abdominal fats in broiler chickens constitutes a loss of dietary energy and also reduces carcass yield. Oil rich in unsaturated fatty acids and L-arginine are effective for reducing fat deposition and improve meat quality. Aims: The aim of this study was to examine the effects of supplementation of L-arginine (L-Arg) with four combinations of palm oil (PO) and sunflower oil (SO) on growth performance, carcass yield, fat deposition, lipogenic gene expression and blood lipid profile in broiler chickens. Methods: A total of 180 1-day-old chicks (Cobb 500) were randomly assigned to five dietary treatments as: T1, 6% PO (control); T2, 6% PO + 0.25% L-Arg; T3, 4% PO + 2% SO + 0.25% L-Arg; T4, 2% PO + 4% SO + 0.25% L-Arg; and T5, 6% SO + 0.25% L-Arg. Key results: Birds fed L-Arg and combinations of PO and SO had higher weight gain at starter and finisher period compared with the control. The carcass yield increased, and relative abdominal fat reduced in broiler fed with combinations of L-Arg and increased level of SO in the diet. The concentration of oleic, palmitoleic and total monounsaturated fatty acids in liver tissue decreased by addition of L-Arg in broiler diet. The palmitic and total saturated fatty acid decreased, and total unsaturated fatty acid and polyunsaturated fatty acids increased in liver tissue when PO replaced progressively by SO supplemented with L-Arg in the diet. The acetyl-CoA carboxylase, stearoyl-CoA desaturase and fatty acid synthetase gene expression tended to decrease by supplementation of L-Arg with an increased level of SO compared with control. Conclusion: Supplementation with L-Arg and combination of PO and SO at the ratio of 4:2 could inhibit lipogenesis and subsequent lower abdominal fat deposition and enhance growth performance and carcass yield in broiler chickens.

Keyword: Acetyl-CoA carboxylase; Fatty acid synthetase; L-Arg; Palm oil; Stearoyl-CoA desaturase; Sunflower oil; Unsaturated fatty acid