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Study on additivity and biological value of digestible amino acid in ingredients for broilers

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Abstract Three experiments were conducted to study the additivity and biological value of digestible amino acid in corn, soybean meal, cottonseed meal, rapeseed meal for broilers.

Experiment 1, 28-day-old AA broilers were randomly assigned into 8 groups (4 groups for male and female broilers respectively). Broilers were offered protein-free diet freely to determine the basal endogenous amino acid losses (BAAL) at the terminal ileum. The results were as follows: there were no significant differences between male and female broilers about BAAL and amino acid composition of endogenous protein ($p>0.05$). BAAL values of female broiler were greater than that of male broiler ($p>0.05$). Value of BAAL of Glu was the greatest ($P>0.05$), value of Asp was secondary, and value of His was lowest in 17 amino acids ($p>0.05$).

Experiment 2, 192 28-day-old AA broilers were randomly assigned into 4 treatments, and were offered 4 diets, corn, soybean meal, cottonseed meal, rapeseed meal, respectively, to determine the ileal amino acid digestibility of amino acid. The results were as follows: ileal digestibilities of some AA were affected significantly by sex of broiler ($p<0.05$). Standardized ileal digestibility (SID) and Apparent ileal digestibility (AID) of His in male broiler were greater than that of female broiler ($p<0.05$) in corn. In rapeseed meal, AID and SID of Gly, Thr, Val of male broiler were greater than that of female broiler ($p<0.05$). There were no significant differences between male and female broilers about AID and SID of amino acid and CP in soybean meal and cottonseed meal ($p>0.05$).

Experiment 3, this experiment was to determine whether the digestibilities of amino acid in a mixed diet for broilers were better predicted when based on SID or AID, and the additivity of ileal digestible amino acid were investigated. 384 28-day-old AA broilers were randomly assigned into 8 treatments. Eight diets were composed of corn, soybean meal, cottonseed meal, rapeseed meal and all diets were formulated to contain 20% CP. AID and SID of amino acid were evaluated. The results were as follows: for mixed diets containing corn, the measured AID for most amino acids were greater than the predicted AID ($p<0.05$), but no significant differences between predicted and measured values for SID were observed ($p>0.05$). For 3 mixed diets without corn, there were no significant differences between predicted and measured values for AID and SID ($p>0.05$). Values of AID and SID were additive in soybean meal, cottonseed meal and rapeseed meal in mixed diets for broilers.

Keywords broiler;amino acid;ileal digestibility;additivity