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Study on additivity and biological value of metabolizable energy in ingredients for broilers

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Abstract Two experiments were conducted to study the additivity and biological value of metabolizable energy in corn, soybean meal, cottonseed meal, rapeseed meal for broilers.

Experiment 1, 240 22-day-old AA broilers were randomly assigned into 5 treatments, with 8 replicates each treatment (4 replicates for male and female broilers respectively). Five diets were prepared based on corn, starch, soybean meal, cottonseed meal and rapeseed meal. Apparent metabolizable energy (AME) and Nitrogen corrected apparent metabolizable energy (AMEn) of corn, soybean meal, cottonseed meal and rapeseed meal were evaluated and TiO₂ was made marker by collecting parts of excreta. The results were as follows: AMEn of male broiler was greater than that of female broiler in soybean meal and cottonseed meal ($P < 0.05$). Sex of broilers had no significant effects on AME and AMEn in corn and rapeseed meal ($p > 0.05$). The utilizable efficiency of AME and AMEn of male broiler were greater than that of female broiler in corn, soybean meal, cottonseed meal and rapeseed meal ($p > 0.05$). AME of corn, soybean meal, cottonseed meal and rapeseed meal were 14.82, 12.10, 11.17, 9.79MJ/kg, and AMEn were 14.80, 11.81, 10.81, 9.60MJ/kg respectively.

Experiment 2, this experiment was to study additivity of AME and AMEn for broilers by comparing differences between measured values for the mixed diets and predicted values from measurements of individual ingredients. 144 22-day-old AA broilers were randomly assigned into 3 treatments. Three diets were prepared by corn mixed soybean meal, cottonseed meal and rapeseed meal. The results were as follows: for AME and AMEn, and their utilizable efficiency, values of male broilers were greater than that of female broilers in corn-rapeseed meal ($p < 0.05$). For AME and AMEn, and their utilizable efficiency, there were no significant differences between male and female broiler in corn-soybean meal and corn-cottonseed meal ($p > 0.05$). There were no significant differences between AME and AMEn, and their utilizable efficiency in 3 mixed diets ($p > 0.05$). There were no significant differences between predicted and measured values for AME and AMEn in 3 mixed diets ($p > 0.05$). Results of the experiment demonstrated that AME and AMEn of broilers between corn and soybean meal, cottonseed meal, rapeseed meal were additive.

Keywords broiler;biological value;metabolizable energy;additivity