PROTEIN QUALITY OF GRAIN LEGUMES FOR CHICKENS: EFFECT OF METHIONINE SUPPLEMENTATION

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Grain legumes are potential sources of protein for poultry production, however they are deficient in sulphur-containing amino acids. In addition, they contain antinutritional factors which may interfere with normal digestive function. This study was aimed to determine the effect of graded levels of methionine supplementation on the protein value of ten grain legumes (black gram, chickpea cv. Desi, chickpea cv. Kaniva, field bean, field pea, green gram, lentil, lupin, pigeon pea and soybean meal), measured as Net Weight Gain (NWG) and Net Protein Ratio (NPR) (Bender and Doell 1957).

Following 2 d adaptation to single cages and diets, 7-d-old broiler chickens were given free access for 14 d to drinking water and to either an isoenergetic diet containing nominally 100 g protein supplied by one legume meal only per kg diet, and without or with methionine supplementation to meet 75% or 100% of chickens' requirements for methionine, or an isoenergetic protein-free diet. Each dietary treatment had eight replicates and chickens were caged in a temperature-controlled room at 31 ± 0.5°C. Body weight gain and feed intake were measured between seven and 21 d of age.

NWG of chickens fed legume as the sole source of protein increased ($P<0.001$) as the level of dietary methionine increased. When the methionine was present at 100% recommended allowance, the NWG of chickens fed the chickpea cv. Kaniva and the lentil diets were in the vicinity of 16 and 5% higher than those fed soybean meal, whereas NWG of chickens fed the black gram, chickpea cv. Desi, field bean, field pea, green gram, lupin and pigeon pea diets were 78, 12, 45, 32, 37 and 38% lower than those fed the soybean meal diet.

Significant linear responses of NPR on dietary percent of methionine (PM) and NWG on methionine intake (MI) were observed for all legumes. The NPR values of all legumes increased ($P<0.001$) with each increase in methionine supplementation. On the basis of the regression of NPR on PM, black gram showed greater ($P<0.05$) response than the pooled response of other legumes. There was no difference in the regression of NWG on MI within chickens fed chickpea cv. Desi, chickpea cv. Kaniva or lentil diets nor within field bean, field pea, green gram, lupin or pigeon pea diets. The pooled response of NWG to MI of chickens fed the supplemented chickpeas, lentil and soybean meal diets was: NWG(g) = 5.84 + 89.39 MI(g), SEb=8.68, $R^2=0.53$, $P<0.001$, which had a greater ($P<0.05$) slope than the pooled regression for field bean, field pea, green gram, lupin and pigeon pea: NWG(g) = -7.43 + 85.26 MI(g), SEb=6.08, $R^2=0.63$, $P<0.001$, but the slope was not as steep ($P<0.05$) as the regression for the black gram diet: NWG(g) = -35.73 + 118 MI(g), SEb=8.89, $R^2=0.90$, $P<0.001$. The protein quality of all 10 grain legumes for poultry was improved by methionine supplementation, however the rate of improvement for each legume varied in one of three different ways.

BENDER, A.E. and DOELL, B.H. (1957). Br. J. Nutr. 11: 140.

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