

# Enzyme supplementation improves protein quality of grain legumes for poultry production

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Enzyme supplementation to legume meals has been shown to increase their ME value (Wiryawan et al. 1995) and improve chick performance (Brenes et al. 1993). It is likely that the protein quality of legumes may also be improved by enzyme supplementation. The objective of this study was to determine the protein quality of a range of grain legumes with and without enzyme supplements.

An isoenergetic N-free diet and ten isoenergetic legume diets containing nominally 100 g kg<sup>-1</sup> protein with and without 1 g kg<sup>-1</sup> supplementation of a multi-enzyme product containing xylanase, a  $\alpha$ -amylase and protease were given to seven-day-old male broilers for 14 days. The treatments were arranged in a 2x10 factorial design with 9 replicates each. The chickens were caged in a temperature-controlled room at 30±0.5°C and had *ad libitum* access to feed and water. The chickens were weighed after overnight fasting at the beginning and end of the observation period. Chicken responses were assessed in terms of Net Protein Ratio (NPR), calculated according to Bender and Doell, (1957). The NPR values and the Neutral Detergent Fibre (NDF) content of each grain legume are presented in Table 1.

The mean NPR of grain legumes increased significantly ( $P<0.01$ ) after supplementation with a multi enzyme product containing xylanase,  $\alpha$ -amylase and

protease. There was a significant ( $P<0.05$ ) positive correlation ( $r = 0.64$ ) between percent improvement in NPR values and the cell wall (NDF) content of grain legumes. Generally legumes with a greater cell wall content showed a better response to mixed enzyme supplementation than those with a lower amount of cell wall content.

## References

- Bender, A.E. and Doell, B.H. (1957). Biological evaluation of protein: a new aspect. *British Journal of Nutrition* **11**, 14-148.
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- Wiryawan, K.G., Dingle, J.G., Kumar, A., Gaughan, J.B. and Young, B.A. (1995). True metabolizable energy content of grain legumes: Effects of enzyme supplementation. *Recent Advances in Animal Nutrition in Australia* p. 196 (Eds. J. B. Rowe and J. V. Nolan). University of New England: Armidale.

**Table 1** The effect of enzyme supplementation on the net protein ratio and neutral detergent fibre content of grain legumes in poultry.

	Faba bean	Chick-pea cv. Des	Pigeon Pea	Lupin	SBM	Chick-pea cv. Kaniva	Black gram	Lentil	Field pea	Green gram
Control	3.00	3.31	3.29	3.34	3.67	3.65	3.02	3.78	3.77	3.86
Enzyme	3.58	3.76	3.69	3.38	3.94	3.88	3.16	3.95	3.91	3.91
Statistics	**	*	*	ns	ns	ns	ns	ns	ns	ns
Improve-ment (%)	19.33	13.60	12.16	8.05	7.36	6.30	4.64	4.50	3.71	1.30
NDF (%)	20.96	23.42	19.57	23.94	16.49	10.85	14.84	13.82	17.76	13.99

ns, not significantly different, \* ( $P<0.05$ ), \*\* ( $P<0.01$ ), SBM = Solvent extracted soybean meal.