

True Metabolisable Energy Content of Grain Legumes: Effects of Enzyme Supplementation

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Enzyme supplements have been shown to increase the ME value of low-ME wheat (Choct *et al.* 1994) and of lupins (Annison *et al.* 1995). It may be possible to improve the ME value of other legumes through enzyme supplementation. The objective of this study was to determine the True Metabolisable Energy (TME) of a range of grain legumes with and without enzyme supplements.

Ten legumes with and without a commercial carbohydrase preparation (Avizyme 13 00, Finfeeds International Ltd., UK) were assayed for their TME content using three-week old male-broiler chicks. The rapid method of Sibbald (1989) was adopted. The chicks were caged in a temperature-controlled room at $30 \pm 0.5^\circ\text{C}$. After a 24h period without feed the chicks were hand-fed 30 - 40g of legume meal in a 1:3 mixture with water. There were three replicates in each treatment with three chickens each. The gross energy content of feed and faecal samples were determined in a Parr Oxygen Bomb Calorimeter. The TME values (MJ/kgDM) neutral detergent fibre (NDF) content of the legumes are shown in the Table.

The TME values of grain legumes for broiler chicks were significantly different and could be grouped into high, medium and low TME values. Chickpea cv. Kaniva showed the highest TME value and faba bean the lowest. There was a tendency for TME to decrease as the NDF content increased ($r = -0.54$, $P=0.11$). Overall, the TME values of grain legumes increased ($P<0.01$) when enzyme was added. However, only the lowest-TME legumes, lupins and faba bean, had a significant increase in TME value with added enzyme. Legumes with the highest NDF and lowest ME values gave the greatest responses to carbohydrase supplementation.

References

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	<i>Chick-pea cv. Kaniva</i>	<i>Chick-pea cv. Desi</i>	<i>Green gram</i>	<i>Field pea</i>	<i>Lentil</i>	<i>Soy meal bean</i>	<i>Pigeon pea</i>	<i>Black gram</i>	<i>Lupins</i>	<i>Faba bean</i>
Control	15.80 ^a	14.09 ^b	14.05 ^b	13.03 ^{bc}	12.41 ^{bcd}	12.53 ^{cd}	10.90 ^{def}	10.69 ^{ef}	9.68 ^f	9.27 ^f
Enzyme	16.08 ^a	14.10 ^b	14.14 ^b	13.02 ^{bc}	13.07 ^{bc}	12.60 ^{cd}	11.37 ^{de}	11.17 ^c	11.27 ^{de}	11.28 ^{de}
Category	high	high	high	medium	medium	medium	low	low	low *	low *
NDF (%)	10.85	23.42	13.99	17.76	13.82	16.49	19.57	14.84	23.94	20.96

ab Values within rows with different superscripts are significantly different ($P<0.05$).

* Values within columns are significantly different ($P<0.05$).