

EVALUATION OF DIGESTIBILITY AND ENERGY CONTENT OF HAY-GRAIN DIETS FOR HORSES

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Lucerne hay and oat grain are two feedstuffs commonly given to horses in Australia. We examined the effect of increasing levels of oat grain in a mixed ration on the digestibility of dry matter (DM) and other constituents, as well as on the digestible energy (DE) of the whole diet. We used this information and results from a previous feeding trial to develop equations to predict DE of horse diets from knowledge of their chemical composition.

Six standardbreds (three geldings and three mares), average live weight 400kg and of similar age and breeding were used in the digestibility trial. The procedures used were as described by Sriskandarajah et al. (1988). The diets used were 100% lucerne chaff (100L), 70% lucerne chaff and 30% oats (70L) and 40% lucerne chaff and 60% oats (40L). Two horses were randomly allocated to each diet and feed was offered at the rate of 22.5 g DM/kg liveweight. At the end of three weeks the horses were reallocated to diets so that at the end of the trial each horse received each diet once. The moisture, nitrogen and neutral detergent fibre (NDF) content of the feeds were (g/kg feed) 103, 26 and 435 for lucerne and 92, 8 and 337 for oat grain respectively. The mean apparent digestibility of DM, organic matter (OM), acid detergent fibre (ADF) and NDF for the three diets and their estimated DE content are shown below.

		100L	70L	40L	SED
Feed Intake (Kg DM/d)		9.0	9.0	9.0	
Apparent Digestibility %	DM	62.07	63.42	62.63	0.714
	OM	63.32	65.08	64.97	0.577
	ADF	38.25	34.77	20.78	1.817
	NDF	39.27	34.57	21.82	1.439
DE MJ/Kg DM	Ration	11.14	11.69	11.98	0.115
	Oats	-	12.97	12.52	-

Apparent digestibilities of the three diets were not significantly different in terms of DM ($P > 0.23$). However, the addition of grain to the diet improved OM digestibility significantly ($P < 0.03$) and fibre digestibility showed significant reduction as the proportion of oat grain increased in the diets ($P < 0.01$). This apparent reduction in fibre digestibility could be attributed to the unfavourable effects of additional dietary starch on fermentation of the fibre component in the hind gut of horses.

The DE content of the whole ration was also significantly increased by the addition of oat grain ($P < 0.01$). The estimated DE values for lucerne chaff and oat grain are 11.14 and 12.75 MJ/kg DM respectively. The results of this feeding trial and those of a previously reported one (Trevor-Jones et al. 1991), were combined in order to develop a set of regression equations to predict the DE based on the chemical composition of feeds. These equations are listed below with their respective regression coefficients.

$$\begin{array}{ll} \text{DE} = 17.48 - 0.148\text{NDF} & r^2 = 0.75 \\ \text{DE} = 17.17 - 0.144\text{NDF} + 0.058\text{N} & r^2 = 0.75 \end{array} \quad \begin{array}{ll} \text{DE} = 14.59 - 0.162\text{ADF} + 0.793\text{N} & r^2 = 0.75 \\ \text{DE} = 2.89 + 0.138\text{DMD} & r^2 = 0.83 \end{array}$$

NDF on its own is a better predictor of DE than N or ADF when a wider range of feedstuffs are used to generate the equation. Inclusion of N with measures of fibre leads to some improvement in the relationship expressed in the equations. The expected strong relationship between DE and DMD is also shown.

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