

# Voluntary intake and apparent digestibility in ponies offered alfalfa based forages *ad libitum*

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**Introduction** There is increased interest in using forages other than grass hay as the basal diet for equines in the UK. Whilst a range of short-chopped dehydrated alfalfa based forages may be used as alternatives to grass hay in equine diets, there is very little information available on their likely intake characteristics, apparent digestibilities or their nutritive values. The objectives of the current experiment were:- 1) to determine the voluntary feed intake (VFI) characteristics of three alfalfa based forages when offered *ad libitum* to ponies, 2) to determine the *in vivo* apparent digestibility, digestible energy (DE) and digestible crude protein (DCP) contents of these forages and 3) to compare the actual energy and protein intakes with theoretical energy and protein requirements.

**Materials and methods** Six mature Welsh-cross pony geldings were individually housed and offered one of three alfalfa based forages *ad libitum* (approximately 30% excess) according to a replicated 3x3 latin square changeover design experiment with 3 periods of 21 days. The 3 forages under study were short-chopped, dehydrated and molassed alfalfa (AA), a blend of AA and oat straw (AA-OS) and AA with added oil and a probiotic yeast culture (AA-OIL). Each 21 day period consisted of a 16 day adaptation phase and a 5 day collection phase when VFI, *in vivo* apparent digestibilities of dry matter (DMD), organic matter (OMD), crude protein (CPD), ether extract (EED), acid hydrolysis EE (AHEED), acid detergent fibre (ADFD), neutral detergent fibre (NDFD) and gross energy (GED) along with the energy and protein intake parameters were recorded. Forage DE and DCP contents were also calculated whilst theoretical energy (DE REQ) and protein (DCP REQ) requirements were predicted according to equations published in NRC (1989) for stalled equines and compared with actual DE and DCP intakes (DEI and DCPI respectively).

**Results** There were only small differences between the CP and NDF composition of forages AA and AA-OIL as offered to the ponies and the CP and NDF composition of the forage refusals indicating only a minimal degree of dietary selection by the ponies. In contrast however, the CP and NDF contents (g/kg DM) of the feed refusals from the AA-OS diet were markedly lower (98 *cf* 75) and higher (602 *cf* 675) respectively. This suggests that despite the thoroughly mixed nature of the forage on offer, ponies actively selected from amongst the dietary constituents in forage AA-OS in favour of the alfalfa components and against the straw components. Pony liveweight (LW), voluntary dry matter intakes (DMI), *in vivo* apparent digestibilities, DE and DCP contents along with nutrient intake parameters are shown in Table 1. Although DMI was slightly lower when forage AA-OS was offered, no significant differences in VFI were seen between the forages. However, whilst not always reaching statistical significance, apparent digestibilities were generally lower when AA-OS was fed. Similarly, inclusion of oat straw significantly reduced ( $P < 0.001$ ) both the DE and DCP contents of the AA-OS forage compared with the AA forage alone. In contrast, inclusion of oil and probiotic significantly increased ( $P < 0.001$ ) the DE but not the DCP content of the AA-OIL forage compared with the AA forage alone. Both the energy and protein intake / requirement ratios were significantly reduced ( $P < 0.01$ ) by the AA-OS forage compared with the AA and AA-OIL forages.

Table 1. Voluntary intake, apparent digestibilities (g/kg) and nutrient intakes in ponies offered alfalfa based forages

	AA	AA-OS	AA-OIL	sed	Sig		AA	AA-OS	AA-OIL	sed	Sig
LW (kg)	315 <sup>a</sup>	319 <sup>ab</sup>	322 <sup>b</sup>	2.58	*	DE	9.4 <sup>a</sup>	7.9 <sup>b</sup>	10.6 <sup>c</sup>	0.19	***
DMI (kg/d)	5.95	5.52	5.90	0.294	NS	(MJ/kg DM)					
(g/kg LW)	18.9	17.4	18.4	0.880	NS	DCP	93 <sup>a</sup>	62 <sup>b</sup>	96 <sup>a</sup>	2.86	***
(g/kg LW <sup>0.75</sup> )	79.5	73.3	77.7	3.760	NS	(g/kg DM)					
						DEI	56.2 <sup>a</sup>	43.4 <sup>b</sup>	62.5 <sup>a</sup>	3.33	**
						(MJ/d)					
DMD	526 <sup>a</sup>	476 <sup>b</sup>	548 <sup>a</sup>	16.5	*	DE REQ	31.8 <sup>a</sup>	32.1 <sup>ab</sup>	32.4 <sup>b</sup>	0.23	*
OMD	506 <sup>a</sup>	462 <sup>b</sup>	529 <sup>a</sup>	15.4	*	(MJ/d)					
CPD	642 <sup>a</sup>	565 <sup>b</sup>	650 <sup>a</sup>	17.8	**	DCPI	558 <sup>a</sup>	338 <sup>b</sup>	565 <sup>a</sup>	39.6	**
EED	-1150 <sup>a</sup>	-280 <sup>b</sup>	-144 <sup>b</sup>	319.5	*	(g/d)					
AHEED	404	396	442	115.7	NS	DCP REQ	189 <sup>a</sup>	192 <sup>ab</sup>	193 <sup>b</sup>	1.55	*
ADFD	352	366	338	24.0	NS	(g/d)					
NDFD	275 <sup>ab</sup>	349 <sup>a</sup>	228 <sup>b</sup>	32.6	*	DEI/DE REQ	1.76 <sup>a</sup>	1.36 <sup>b</sup>	1.93 <sup>a</sup>	0.095	**
GED	487 <sup>a</sup>	423 <sup>b</sup>	527 <sup>c</sup>	9.2	**	DCPI/DCP REQ	2.95 <sup>a</sup>	1.77 <sup>b</sup>	2.93 <sup>a</sup>	0.201	**

**Conclusions** The results indicate that in practice, equines are likely to consume a wide range of alfalfa based forages in similar amounts and that suitable equine forage mixes with varying nutritional characteristics can be manufactured by blending additional dietary ingredients with short-shopped dehydrated alfalfa.

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## Reference

NRC (1989). *Nutrient Requirements of Horses*. 5<sup>th</sup> edition. National Academy Press, Washington, DC, USA.