

Effect of additives at harvest on the digestibility in lambs of whole crop barley or wheat silage

S. Muhonen, I. Olsson and P. Lingvall

Swedish University of Agricultural Sciences, Department of Animal Nutrition and Management, Kungsängen Research Centre, SE-753 23 Uppsala, Sweden, Email: Sara.Muhonen@huv.slu.se

Keywords: bacterial additives, digestibility, formic acid, whole crop silage

Introduction There are very few published articles about how silage additives affect digestibility of whole crop silage. In this experiment, male lambs were given whole crop barley or wheat silage harvested at dough stage with a number of different acid-based and bacterial additives.

Materials and methods Spring varieties of barley (37% dry matter (DM) or wheat (45% DM) were harvested as whole crop silage at the middle of dough stage (24-27 July 2003). At harvest either no additive (control), acid-based additives (Promyr, Promyx and Kofasil Ultra) or bacterial additives (Lactisil wholecrop and Lactisil NB200), were used. Fifteen male lambs (Swedish finewool) with an average live weight (LW) of 45 kg were used in three subsequent digestibility experiments. The digestibility of each silage was determined on three animals. Each of the three experiments comprised at least one of the control silages. Feed allowances were adjusted according to the LW to meet the requirements for 0.1 kg daily weight gain. Soybean meal was added to cover the protein requirements and constituted 10% of total diet DM. The statistical analyses were performed using the mixed procedure of SAS (SAS, 1999).

Results The silages used for all treatments were well fermented with low contents of ammonia, butyric acid and ethanol. Control silages and silages treated with acid-based additives had higher pH and lower content of lactic acid than treatments with bacterial additives. All lambs ate the diets with good appetite, but in most cases the allowances were not completely consumed. There were no significant differences in DM, organic matter (OM) and gross energy (GE) digestibility between the two crops. Neutral detergent fibre digestibility was higher ($P<0.001$) for barley than wheat diets. Crude protein (CP) digestibility was significantly ($P<0.05$) higher for wheat than barley diets. There were no significant interactions between crops and additives. There were no differences in DM, OM, CP and GE digestibility (Table 1) as an effect of different additives.

Table 1 Dry matter (DM), organic matter (OM), crude protein (CP) and gross energy (GE) digestibility (%) of whole crop silage diets preserved with different additives (means over both crops). Least squares means (LSM), standard error of the mean (SEM) and significance level for pair-wise comparisons between additives using Bonferroni correction. NS – not significant ($P>0.05$)

		Additives						Significance level
		Control	Promyr	Promyx	Kofasil Ultra	Lactisil wholecrop	Lactisil NB200	
DM	LSM	60.9	62.8	62.5	62.6	60.8	63.7	NS
	SEM	0.69	1.43	1.43	1.27	1.43	1.43	
OM	LSM	64.1	65.7	65.4	65.6	63.8	66.9	NS
	SEM	0.65	1.36	1.36	1.21	1.36	1.36	
CP	LSM	70.7	68.8	70.3	68.4	70.0	70.6	NS
	SEM	0.78	1.59	1.60	1.45	1.59	1.58	
GE	LSM	61.1	62.8	62.1	61.7	59.3	62.8	NS
	SEM	0.75	1.55	1.55	1.38	1.55	1.55	

There were no differences in digestible energy and metabolisable energy contents (MJ/kg DM) between the barley and wheat diets. DM intake (g/kg LW) was higher ($P<0.001$) for wheat than barley diets, but there were no differences between the different additives.

Conclusions The present findings do not indicate that the additives used have an important effect on the digestibility of whole crop barley or wheat silage.

Reference

SAS (1999). SAS/STAT User's Guide, version 8. SAS Institute Inc.:Cary, NC, USA.