

The effect of different additives on protein in silage made from high and low sugar herbage

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Silage inoculants have clearly been shown to be very effective in manipulating silage fermentation characteristics, protein content and often animal performance (Merry *et al*, 1993, Ciencia E Investigacion Agraria, 20, 372-401). However, their efficacy under wet, low sugar conditions is equivocal.

A comparison was made between two herbage, a first cut ryegrass (herbage 1) and a regrowth of a mixed sward of ryegrass and white clover (herbage 2). Both were chopped, treated with additive and triplicate amounts packed into laboratory silos (1.2 kg of herbage). Additive treatments were control (water), freshly cultured *Lactobacillus plantarum* (10⁶ CFU/g fresh matter [FM]) and formic acid (3 l/tonne FM). Ninety day silages were analysed for pH, dry matter (DM), lactic acid and ammonia-N concentrations, and fraction 1 leaf protein (F1LP; expressed as a percentage of the original herbage F1LP) by fast protein liquid chromatography.

The herbage had low but quite different DM (g/kg FM) and water soluble carbohydrate (WSC; g/kg DM) contents of 192.8; 250 and 143.5; 66 respectively for herbage 1 and 2. All silages produced from herbage 1 were well preserved irrespective of treatment, with pH values of less than 3.7. However, the pH of

silages made from herbage 2 were >5.0 in untreated and inoculant treated silage but <4.5 in acid treated silage. Inoculant treated silages prepared from herbage 1 had considerably lower ammonia-N values than control and acid treated silages, with corresponding and significantly (P<0.05) higher proportions of intact F1LP in the inoculant treated silage and lower values in the control and acid treated silages. However, in silages prepared from herbage 2 residual F1LP values were all very similar at ca 45 % of the initial herbage content.

A good fermentation can be expected irrespective of treatment where adequate WSC is available. However, freshly cultured inoculant treatment of herbage significantly increased the residual F1LP content of these silages and was supported by a very low ammonia-N concentration compared to either no or acid treatment of high sugar herbage thus giving potential for improved animal production response. Where the herbage DM and WSC contents were low, however, little advantage in terms of protein retention was observed with any treatment, which may be related to rate of pH decline as affected by amount and availability of grass WSC (see Merry *et al*, 1995, this issue).

	Herbage 1			Herbage 2		
	Control	Inoculant	Acid	Control	Inoculant	Acid
Ammonia-N g/kg TN	54.38	18.45	54.73	260.45	305.82	72.13
F1LP (% of original herbage F1LP)	51	62	53	47	44	47