EFFECTS OF DRY MATTER AND ADDITIVE ON WILTED BALE SILAGE QUALITY AND MILK PRODUCTION

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INTRODUCTION

Wilting of grass is required to efficient bale silage production, to improve fermentation quality and decrease clostridial deterioration of silage. However, risks of aerobic spoilage may increase with increasing dry matter content. Bale silages are often made without additive.
The aim of this study was to assess the effects of grass dry matter content and an acid-based additive on round bale silage fermentation, microbiological quality, aerobic stability and milk production.

METHODS

* **Silages** were made from a timothy-meadow fescue (*Phleum pratense–Festuca pratensis)* sward
* wilted for on an average 9 or 56 h to dry matter contents of 311 and 481 g kg^{-1} (DM1 and DM2)
* ensiled with no additive or acid additive (formic acid 425, ammonium formate 303, propionic acid 100 benzoic acid 22 and water 150 g kg^{-1}, Kemira Oyj), 4.6 and 5.0 l Mg^{-1} for DM1 and DM2, respectively
* Bales were wrapped using white 750 mm stretch film with six layers

* **Milk production** was studied with 16 Ay-cows, in a replicated 4 x (4 x 4) latin square experiment
* Silage was fed ad libitum and concentrate 11 and 13 kg for primiparous and multiparous cows

RESULTS

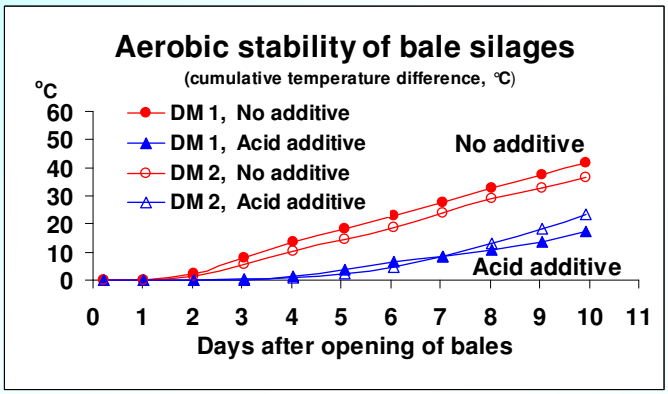
* **All silages** were of good quality. Acid treatment restricted fermentation of lower DM grass, evidenced by higher WSC and lower lactic acid content than in no additive treated silage
* Higher DM content decreased fermentation of both silages and increased pH
* The counts of yeasts and moulds at feeding varied between bales, being 2.8-6.7 log cfu g^{-1} for yeasts and 1-5.2 log cfu g^{-1} for moulds => prolonged storage after opening of bale can impair microbiological quality of silage

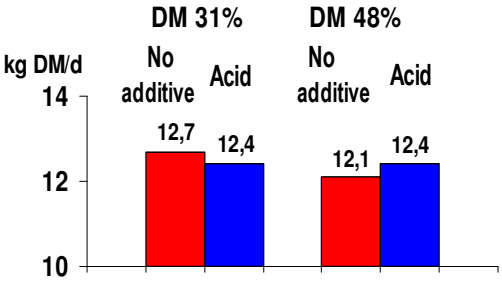
Chemical composition and quality of bale silages

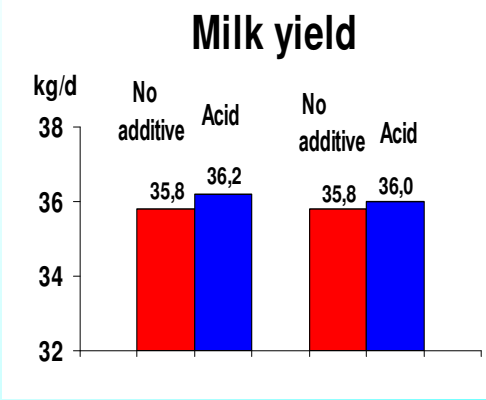
Silage	Dry matter	Crude protein	NDF	D-value	pH	WSC	Lactic acid	Acetic acid	Butyr. acid	NH_4 N	Yeast	Mould	Aer. bact spores
	g kg^{-1}	g kg^{-1} DM				g kg^{-1} DM				g kg^{-1} N	log cfu g^{-1}		
DM1													
No additive	310	136	558	697	4.50	50	61	12	0.3	63	5.02	2.87	1.63
Acid "	311	141	549	705	4.45	92	36	10	0.3	83	4.36	2.72	1.33
DM2													
No additive	472	142	582	690	5.06	84	23	6	0.3	41	4.69	1.36	2.15
Acid "	490	146	575	695	5.10	94	14	6	0.2	42	5.00	2.11	1.65

* **In milk production trial** no significant differences were found in milk or milk constituent yields, milk composition or dietary nitrogen utilization for milk protein production between silage DM contents or additive treatments

Aerobic stability is presented as a cumulative temperature difference (sample temperature minus ambient temperature). **Acid treated silages started to warm up two days later than untreated silages**







Conclusions

* In favourable harvesting conditions all the silages were of good quality, and the dry matter content and the acid additive treatment of grass had only minor effects on the bale silage fermentation and microbiological quality, and on the milk production and milk composition.

* However, the acid additive improved the aerobic stability of the silages, suggesting better microbiological status in acid-treated than in untreated silage.

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