Influence of wilting and additives on the quality and safety of *Festulolium pabulare* silages

J. Skladanka, P. Dolezal, Z. Havlicek, L. Zeman, O. Mikel
Mendel University in Brno, Department of Animal Nutrition and Forage Production Email: jiri.skladanka@mendelu.cz

Introduction *Festulolium pabulare* is a hybrid from the crossing of *Festuca arundinacea* and *Lolium multiflorum* (Wacker et al., 1984), thanks to *Festuca arundinacea* is resistant to fungal diseases and dry weather conditions (Holubek et al., 2007). Thanks to the suitable selection of lactic acid bacteria, biological inoculants have a beneficial effect on the improvement of the fermentation quality of silages (Jatkausas et al., 2010). Prerequisite for high-quality silage are not only the bacteria of lactic fermentation but also a clean and healthy phytomass (Holubek et al., 2007). Development of microscopic fungi may lead to the formation of mycotoxins (Opitz von Boberfeld et al., 2006).

Material and methods The experiment was carried out in triplicates. The cut of *Festulolium pabulare* (cv. Felina) was end of May (stage of earing). The plots (1.5 x 10 m) were harvested by the self-propelled mowing machine. Stubble height was 0.07 m. The assessed grasses were wilted 24 hours (DM 40 %) resp. 12 hours (DM 20 %). Use preservatives were probiotic inoculant (*Enterococcus faecium*, *Lactobacillus lactis*, *Pediococcus pentosaceus*, *Lactobacillus planatarum*, *Lactobacillus casei*), ($30x10^9$ CFU; 5 g t^{-1}), probioenzymatic inoculant 1 (the same bacteria and cellulase a hemicellulase), ($40x10^9$ CFU; 15 g t^{-1}), chemical ingredient (43 % formic acid, 10 % propionic acid, 30 % ammonium formate, 2,0 benzoic acid), (4 l t^{-1}) and probioenzymatic inoculant 2 (*Enterococcus faecium*, *Lactobacillus plantarum*, *Pediococcus acidilactici*, *Lactobacillus salivarius*, cellulase, hemicellulase, and amylase), ($1x10^{11}$ CFU; 10 g t^{-1}). Biomass was ensilaged in micro experimental silos. Silages sampled 60 days after the beginning of conservation were assessed for pH, acidity of water extract (AWE), contents of lactic acid (LA), acetic acid (AA) and content of ergosterol.

Results and Discussion Use of silage additives and dry matter influenced quality of water extract silages (Table 1). Probiotic and probioenzymatic inoculants contributed to lower ($P<0.05$) pH and higher ($P<0.05$) acidity water extract (AWE). Silage additives significant ($P<0.05$) contributed to lower contents of ethanol and NH_3. Significant ($P<0.05$) was interaction between preservatives (PR) and dry matter (DM). At dry matter 20 % organic acids decreased pH and increased AWE while at dry matter 40 % decreased pH and increased AWE rather probiotic and probioenzymatic inoculants. Silage preservations influenced content of ergosterol. The lowest content of ergosterol and this probably lower contamination with fungal shown silages preservation with probioenzymatic inoculants and organic acids.

Conclusion Silage additives decreased content of ethanol and NH_3 in the grass silage water extract. Influence of additives on the pH and AWE depended on the dry matter of silage grass. Additives especially probioenzymatic inoculants and organic acids influenced content of ergosterol.

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Table 1 Effect of preservative (PR) and dry matter (DM) on pH, acidity of water extract (AWE), contents of lactic acid (LA), acidic acid (AA), ethanol and NH_3 in grass silages

Factor	pH	AWE mg 100 g^{-1}	LA % of DM	AA % of DM	Ethanol % of DM	NH_3 % of DM
Preservatives (PR)						
Control	4.54^{a}	1194.5^{a}	13.5^{ab}	1.35^{ab}	4.02^{a}	0.24^{a}
Probiotic	3.98^{b}	1819.0^{b}	14.1^{a}	1.86^{b}	2.72^{b}	0.17^{bc}
Probioenz. 1	3.96^{b}	1717.7^{b}	14.0^{a}	1.65^{ab}	1.93^{cd}	0.16^{c}
Organic acids	4.22^{ab}	1346.9^{a}	10.8^{c}	1.14^{a}	1.43^{d}	0.18^{b}
Probioenz. 2	4.51^{a}	1266.3^{a}	11.3^{bc}	1.30^{ab}	2.31^{bc}	0.20^{d}
Dry matter (DM)						
20	4.19	1276.4^{a}	17.8^{a}	2.18^{a}	1.06^{a}	0.29^{a}
40	4.30	1661.4^{b}	7.7^{b}	0.73^{b}	3.91^{b}	0.09^{b}
PRxDM	0.0068	0.0006	0.0495	0.0044	0.0000	0.0000

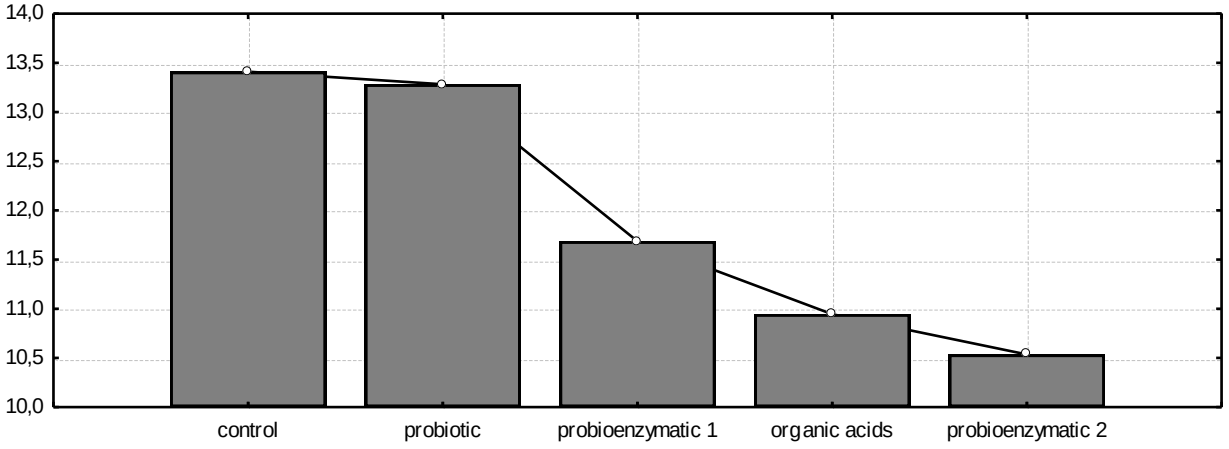

Figure 1 Effect of preservative on content of ergosterol (mg kg^{-1} DM) in grass silages