

[Back](#)

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SAARISALO, EEVA, JALAVA, TAINA, SKYTTÄ, EIJA, HAIKARA, AULI, JAAKKOLA, SEIJA,

Effect of lactic acid bacteria inoculants, formic acid, potassium sorbate and sodium benzoate on fermentation quality and aerobic stability of wilted grass silage

Keywords silage making, grass silage, wilting, additives, aerobic stability, inoculants, formic acid, fermentation, sodium benzoate, potassium sorbate,

### Abstract

The efficiency of a novel strain of lactic acid bacteria inoculant (*Lactobacillus plantarum* VTT E-78076, E76) on the fermentation quality of wilted silage was studied. Furthermore, the possibility to improve aerobic stability of silages by combining an inoculant and chemical preservatives was investigated. Two experiments were conducted with wilted timothy-meadow fescue herbage (dry matter 429 and 344 g kg<sup>-1</sup>) using six treatments. In experiment I, E76 (106 cfu g<sup>-1</sup> fresh matter (FM)) was applied alone and in combination with sodium benzoate (0.3 g kg<sup>-1</sup> grass FM) or low rate of formic acid (0.4 l t<sup>-1</sup> FM). In experiment II, E76 and a commercial inoculant were applied alone and in combination with sodium benzoate. Untreated silage and formic acid (4 l t<sup>-1</sup> FM) treated silage served as negative and positive controls in both experiments. The effect of sodium benzoate and potassium sorbate in experiment I, on aerobic stability was tested by treating silages prior to aerobic stability measurements. The novel lactic acid bacteria inoculant was equally effective in improving fermentation quality as the commercial inoculant. However, the aerobic stability of both inoculated silages was poorer than that of formic acid treated or the untreated one in one of the experiments. The results suggested that antimicrobial properties of E76 were not effective enough to improve aerobic instability. One option to overcome this problem is to use chemical additives in combination with the inoculants.

Contact [eeva.saarisalo@mtt.fi](mailto:eeva.saarisalo@mtt.fi)

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