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Dynamic fermentation characteristics of alfalfa silage with additives

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Introduction The difficulties in preparing silage from alfalfa have been remarked because of its low water soluble carbohydrate (WSC) content. The silage additives such as the lactic acid bacteria (LAB), sugar, and previous fermented juice (PFJ) can change the fermentation quality (Nishino *et al*, 1999). The pH, lactic acid (LA), butyric acid (BA) and ammonia nitrogen (NH₃-N) were mostly used as measure index to evaluate the fermentation quality of silage. The experiment was undertaken to study the dynamic fermentation characteristics of alfalfa silage with additives

Materials and methods The first cutting alfalfa (*Medicago sativa* L) harvested at early blooming stage was used in this experiment. Treatments included four additives with PFJ (0.2% fresh weight, FW), LAB (5×10⁵ CFU/g FW), sugar (S, 1%FW), LAB+S (5×10⁵ CFU/g+1% FW) and control without additive, each with three replicates. All the alfalfa silages were stored at room temperature and sampled at 2d, 5d, 10d, 15d, 30d and 45d respectively to analyze fermentation quality.

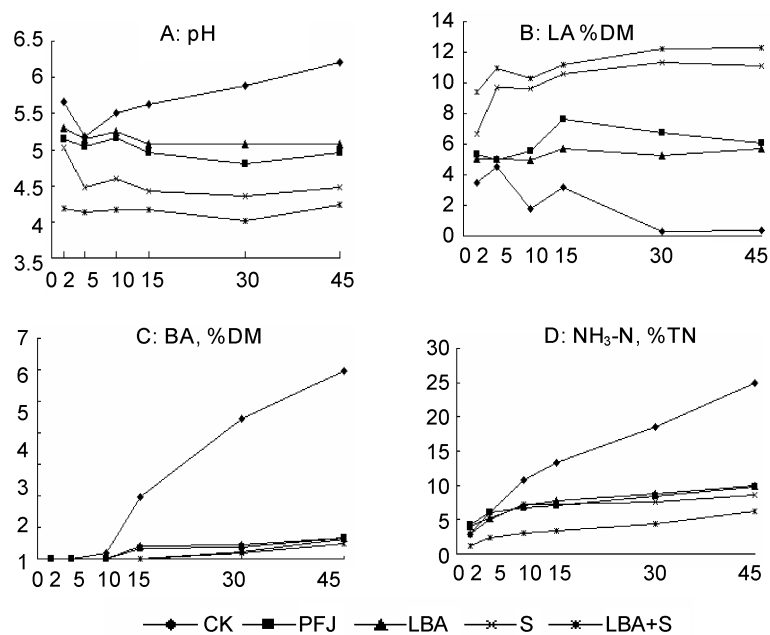


Figure 1 The dynamic fermentation characteristics of alfalfa silage.

Results There were lower pH, and NH₃-N and butyric acid content, and higher lactic acid content in alfalfa silage treated with additives than in control. This indicated that the additives promoted the fermentation of alfalfa silage. The pH of control was lower at 5 days after ensiling but gradually increased, while that of alfalfa silage treated with additives decreased as the storage was extended. The lactic acid content of alfalfa silage treated with sugar or lactic acid bacteria and sugar and the butyric acid and ammonia nitrogen content of all alfalfa silage increased gradually with the storage extending.

Conclusions The additives of PFJ, LAB, sugar can promote the fermentation of alfalfa silage at early stage. The lowest pH and NH₃-N contents, and highest lactic acid content of alfalfa silage treated with lactic acid bacteria and sugar indicate that there is the interaction effects of lactic acid bacteria and sugar on fermentation.

Reference

Naoki Nishino, Senji Uchida (1999). Laboratory evaluation of previously fermented juice as a fermentation stimulant for Lucerne silage. *Journal of the Science of Food and Agriculture*. 79, 1285-1288.