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The effect of different additives on alfalfa silage quantity

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Key words : alfalfa , silage additive , silage quantity , dynamic change

Introduction Alfalfa is characterized as having a high protein content , low water-soluble carbohydrate content (WSC) and having great buffer energy (390~570mE) to limit the pH decrease during silage (McDonald ,1991) , all of which significantly affected the alfalfa silage research and application in practice . This paper presents the finding of our study .

Materials and Methods Alfalfa (*Medicago sativa*) samples were wilted to 60~70% water content . The silage additive treatments used in this study are as follows : formic acid (5.0ml/kg , 5.5ml/kg and 6.0ml/kg respectively) , sucrose (10g/kg , 20g/kg and 30g/kg respectively) , previously fermented juice (PFJ) (1.5ml/kg , 2.0ml/kg and 2.5ml/kg respectively) , Smooth Brome (*Bromus inermis*) (20% , 25% and 33% respectively) . 20g silage products from each sample were obtained at 2d , 8d , 15d and 45d respectively , which were used for pH , ammonia nitrogen and lactic acid testing .

Results pH value showed a downtrend in 4 treatments with increasing doses of additives (other than PFJ group) (Figure 1) . High levels of sucrose additive gave the lowest pH of silage at the fermenting stage . Smooth Brome of 25% significantly affected the pH value ($P < 0.01$) at 45d compared with the values obtained from the samples taken on the three earlier sampling dates .

The NH_3-N concentration showed an upward trend in all 4 treatments (Figure 2) . The control and formic acid additive group had the highest NH_3-N concentration at 45d , higher than that given in the 3 earlier sampling dates ($P < 0.01$) . At 45d , the NH_3-N concentration of medium and high sucrose additive groups were the lowest .

The sucrose additive group had a stronger effect on lactic acid production (Figure 3) , among this group , 30g/kg significantly improved lactic acid production compared with the other 3 levels used .

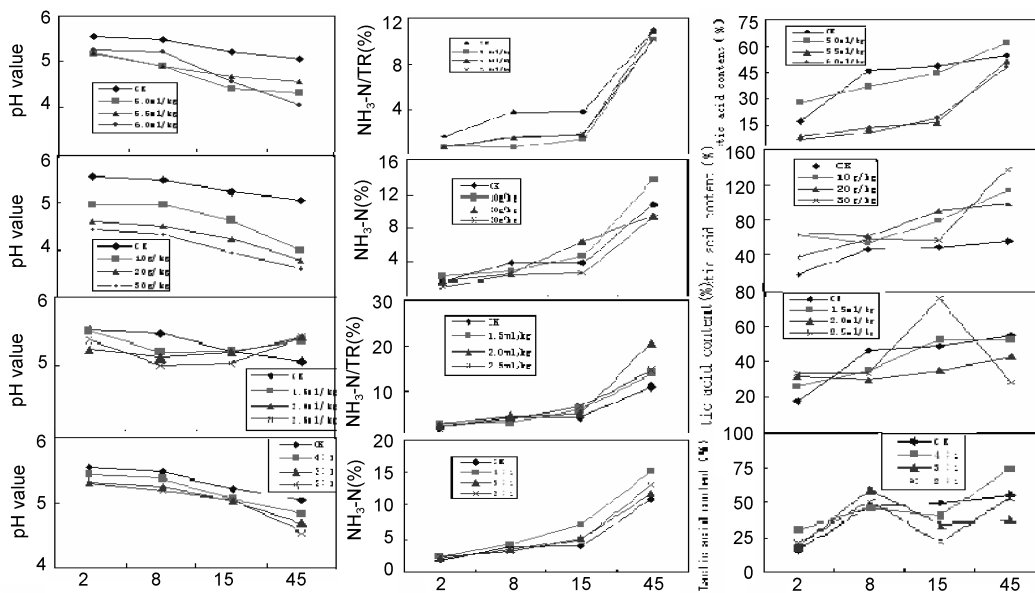


Figure 1 dynamic change of pH value . **Figure 2** dynamic change of NH_3-N/TN . **Figure 3** dynamic change of lactic acid .

Conclusions 5.5ml/kg and 6.0ml/kg of formic acid can inhibit the natural fermenting of silage . The addition of 20g/kg and 30g/kg of sucrose can increase the output of lactic acid and decrease the NH_3-N production , as such this should be the preferred additive .

Reference

McDonald , P . , Henderson , A . R . , Heron , S . J . E . , 1991 . The Biochemistry of Silage . Marlow , Bucks , England : Chalcombe Publ .