Effects of Additives on the Alfalfa Fibrous Residues Silage Quality

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Introduction The utilization of alfalfa fibrous residues (AFR) after leaf protein extraction is important in that the fraction accounts for 50%-80% of the dry matter harvested in the whole alfalfa plant (Pirie N W ,1987) . Considering the importance of AFR as a feed source and of the ensiling technique for the conservation of AFR , this experiment was undertaken to study the effect of ensiling additives on the quality of alfalfa fibrous residue (AFR) silage .

Materials and methods The third cutting alfalfa (*Medicago sativa* L) was harvested at pre-bud stage and immediately disintegrated in a laboratory triturator . The AFR after leaf protein extraction was used to ensile with a number of different additive treatments , which were : sucrose (S , 2% fresh weight , FW) , corn flour (CF , 5% FW) ; formic acid (FA , 0 .2% FW) , lactic acid bacteria (LAB , 5×10^5 CFU/g FW) , and a control without any additives . The three bagged AFR silages of each treatment were stored at room temperature and were sampled 60d for quality analysis .

Results The pH , NH_3-N and NP-N contents of the silage treated with S , CF and FA were shown to be significantly lower than the control ($p<0.01$) , but the CP content was not significantly different ($p>0.01$) . There was no BA in the silage with the S , CF and FA treatments . The DM content in each treatment with additives was significantly higher than the control ($p<0.01$) . In the LBA treatment , the pH , WSC , NP-N , NDF and ANF contents in the AFR silage showed no difference to the control .

Table 1 *The quality of the AFR silage .*

Treatments	pH	LA g/kg DM	BA g/kg DM	NH_3-N/TN %	DM g/kg	WSC g/kg DM	CP g/kg DM	NPN/TN %	NDF g/kg DM	ADF g/kg DM
CK	4 .73^{a}	49 .2^{c}	5 .7^{b}	9 .48^{a}	208 .2^{e}	7 .1^{c}	152 .3	58 .22^{ab}	486 .0^{b}	315 .9^{a}
S	3 .84^{c}	65 .4^{b}	0^{c}	3 .14^{c}	220 .3^{d}	11 .8^{a}	155 .3	51 .26^{d}	470 .1^{b}	283 .6^{b}
CF	4 .30^{b}	84 .8^{a}	0^{c}	6 .82^{b}	232 .6^{bc}	6 .8^{c}	151 .0	52 .75^{c}	524 .1^{a}	26 .90^{b}
FA	3 .98^{c}	36 .8^{f}	0^{c}	2 .71^{c}	241 .2^{a}	10 .0^{b}	151 .3	48 .57^{d}	446 .7^{c}	311 .4^{ab}
LAB	4 .75^{a}	41 .6^{d}	8 .0^{a}	6 .61^{b}	228 .5^{c}	7 .1^{c}	149 .2	55 .84^{bc}	477 .5^{b}	293 .6^{ab}
SE	0 .05	1 .8	0 .01	0 .16	2 .0	0 .2	2 .0	0 .80	7 .6	6 .5

Note : Means in the same row whit different letters differ significantly ($P<0.01$) ; CK : Control ; S : 2%Sucrose ; CF : 5%Corn flour ; FA : 0 .2%Formic acid ; LAB : Lactic acid bacteria .

Conclusions The additives of S , CF , FA can improve the quality of AFR silage . The lowest pH , NH_3-N , NP-N and NDF contents of AFR silage treated with formic acid meant that the formic acid can restrain the bad microorganism in the silage . Lactic acid bacteria did not improve silage quality .

Reference

Pirie N W (1987) . Leaf protein and its by-product in human and animal nutrition [M] . *Cambridge : Cambridge university press* , 125-138 .