Quality of High Moisture Corn Silage Added of Whole Soybean, Whole Sunflower or Urea

C. C. Jobim
State University of Maringa, Brazil

F. A. F. Macedo
State University of Maringa, Brazil

A. F. Branco
State University of Maringa, Brazil

C. R. Alcalde
State University of Maringa, Brazil

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C .C . Jobim , F .A .F . Macedo , A .F . Branco and C .R . Alcalde
Department of Animal Science—State University of Maringa , Av . Colombo , Maringa-Pr .
(ccjobim@uem .br , fafmacedo@uem .br , afbranco@uem .br , cralcalde@uem .br

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Introduction A disadvantage when using high moisture corn silage in ruminant diets is the difficulty to formulate and store concentrate in advance . So , the inclusion of other feeds during ensilage could be an option to obtain silage with higher nutritional value similar to commercial concentrates . Jobim et al . (2003) stated that quality of high moisture corn silage can be improved by addition of whole soybean , whole sunflower and urea , without negative effects on silage preservation . This study was carried out to evaluate the quality of high moisture corn ensiled with whole soybean , whole sunflower and urea .

Materials and methods The experiment was conducted at State University of Maringa , Maringa—Brazil . Treatments were : 1) high moisture corn silage (HMCS) ; 2) HMCS+20% whole soybean ; 3) HMCS+20% whole sunflower , and 4) HMCS+1% urea . A completely randomized design was applied with four replicates . Silages were produced in plastic containers of 200 litres . Silages were analyzed for dry matter (DM) , crude protein (CP) , ether extract (EE) and starch . Silage degradability was obtained through nylon bag *in situ* technique conducted using four rumen cannulated Holstein steers (480 kg) . Silages DM and CP degradability were calculated according Orskov & McDonald al . (1979) . Incubation times were 0 , 6 , 12 , 24 , 48 e 72 hours . Results were analyzed using ANOVA and means were compared by Tukey test (SAS , 2003) .

Results Inclusion of whole soybean , whole sunflower and urea affected CP , EE and starch contents as shown in Table 1 . Inclusion of whole sunflower in HMCS reduced potential degradability (PD) of DM and CP . Inclusion of whole soybean and urea in HMCS decreased effective degradability of DM and CP which can be attributed to higher EE .

Table 1 *Chemical composition and ruminal degradability of high moisture corn silage added with whole soybean , whole sunflower and urea .*

Items	DM (%)	OM (%)	EE (%)	CP (%)	Starch (%)	PD		ED (2%/h)	
						DM	CP	DM	CP
HMCS	62 .1	94 .5	5 .2c	10 .1b	64 .2b	91 .43ab	96 .53a	88 .86a	95 .52a
HMCSWSB	65 .6	93 .0	10 .3b	17 .7a	51 .2c	93 .46a	98 .67a	80 .51b	84 .99b
HMCSWSF	65 .0	95 .1	11 .9b	10 .9b	56 .8bc	84 .75b	92 .75b	73 .81c	85 .39b
HMCSU	65 .7	94 .4	4 .9c	20 .2a	59 .3b	90 .61ab	97 .84a	87 .34a	96 .91a
VC	5 .2	3 .8	8 .7	9 .6	13 .4	7 .6	9 .2	8 .3	8 .6

HMCS=high moisture corn silage ; HMCSSF=high moisture corn silage+whole sunflower ; HMCSU=high moisture corn silage+1% urea ; *P*=P values , VC=variation coefficient
Different letters within a column indicate significant differences (Tukey Test ; P<0 .05) .

Conclusion Addition of whole soybean , whole sunflower and urea improved chemical composition of high moisture corn silage .

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