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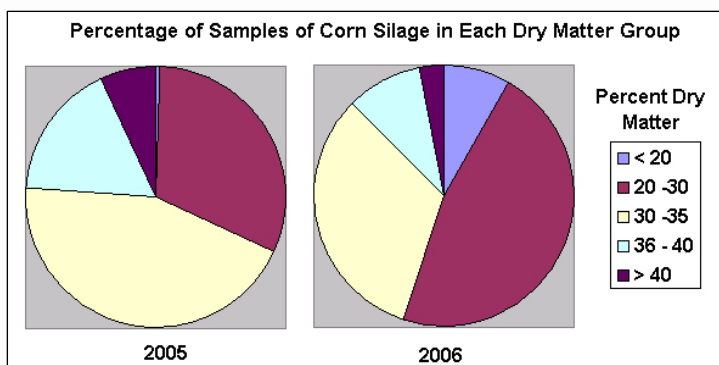
AGRICULTURE

FOOD

# Corn Silage Quality in Vermont - 2006

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The following tables summarize corn silage quality data from samples tested at the University of Vermont Agricultural Testing Lab. Table 1 gives an overall summary of 2006 compared to data collected at the same time period in 2005 while Table 2 on the next page compares quality data by dry matter content groupings (2006 samples only). In terms of fiber and energy (ADF, NDF and NE<sub>L</sub>, NFC and starch), overall corn silage quality was slightly better in 2005 than 2006 most likely due a the greater percentage of samples harvested wet in 2006 (see figure).



**Table 1. The mean and standard deviation range in forage quality values of corn silage samples tested in October and November of 2005 compared to 2004 at the University of Vermont Agricultural Testing Lab.**

Measurement	unit	2006 Corn Silage			2005 Corn Silage		
		Mean	Range of Values*		Mean	Range of Values*	
Dry Matter	% of total	29	23	- 36	32	27	- 37
Crude Protein	% of total	7.0	6.0	- 8.0	7.2	6.5	- 8.0
ADIN	% of CP	0.36	0.13	- 0.60	0.26	0.13	- 0.39
Available CP	% of total	7.0	6.0	- 8.0	7.2	6.5	- 8.0
Soluble CP	% of CP	36	21	- 50	45	32	- 57
ADF	% of total	26	20	- 32	23	19	- 27
NDF	% of total	46	37	- 54	40	35	- 46
Fat	% of total	2.6	2.1	- 3.1	2.8	2.5	- 3.2
Ash	% of total	4.1	3.2	- 4.9	3.7	3.2	- 4.2
Lignin	% of total	3.0	2.3	- 3.6	3.1	2.4	- 3.8
NEL	Mcal/lb	0.7	0.68	- 0.78	0.75	0.72	- 0.79
TDN	% of total	70	68	- 73	71	70	- 73
NFC	% of total	42	33	- 51	47	42	- 53
NDICP	% of total	1.5	1.2	- 1.9	1.5	1.2	- 1.9
Lignin	% of NDF	6.6	5.1	- 8.2	7.8	6.1	- 9.5
ADICP	% of CP	5.0	2.3	- 7.8	3.6	1.9	- 5.4
NDICP	% of CP	22.6	16.7	- 28.4	21.3	15.7	- 26.9
Sugar	% of total	1.9	1.4	- 2.5	1.7	1.3	- 2.0
Starch	% of total	37	28	- 45	39	33	- 45
NSC	% of total	39	30	- 47	41	35	- 47
Calcium	% of total	0.21	0.16	- 0.26	0.19	0.16	- 0.22
Phosphorus	% of total	0.25	0.22	- 0.27	0.25	0.22	- 0.27
Potassium	% of total	1.1	0.9	- 1.4	1.0	0.8	- 1.2
Magnesium	% of total	0.16	0.14	- 0.19	0.15	0.14	- 0.17
No. of Samples			461			486	

\*A range of 1.0 standard deviation which represents about 2/3's of the total samples that are distributed around the mean

Dry matter (DM) content of corn silage depends greatly on the maturity of the corn at time of harvest often reflecting the proportion and development of kernels in the silage. From Table 2, we see that as corn silage increased in dry matter content, there was a general decrease in crude protein (CP), acid detergent fiber (ADF), and neutral detergent fiber (NDF) but an increase in starch suggesting that the leaf/stalk to grain ratio also decreased as dry matter increased. Research has shown that, generally, the best milk production by dairy cows fed corn silage occurs when whole plant dry matter content is between 30 and 35% or 65 to 70% moisture content (Shaver et. al. 2004). In our summary of 2006, only about a third of all samples had dry matter levels in this optimum range.

Over fifty percent of the corn silage samples submitted to the UVM Agricultural Testing Lab this fall have been wetter than normal (lower than 30% dry matter) resulting in higher fiber, lower energy and lower starch content. Due to the excessive rain in early summer, many fields were either planted late or had to be replanted resulting in a higher number of immature fields at harvest time. Wet samples can also lead to poor silage quality including higher silage pH, low lactic acid and high butyric acid content.

Harvesting too dry (> 40%) often results in poor packing, which can cause improper fermentation and poor aerobic stability. Although NDF is lowest in this group, which would imply a higher potential dm intake, research has shown that the digestibility of this NDF is lower than the NDF harvested at an earlier maturity. Starch was highest in this group; however at this late maturity, starch digestibility is probably low especially if silage has not been processed.

<b>Table 2. The average forage quality values of corn silage samples tested at the University of Vermont Agricultural Testing Lab in October, November and December of 2006 and grouped by dry matter content.</b>						
		<b>Silage Dry Matter Content</b>				
<b>Measurement</b>	<b>unit</b>	<b>&lt;20%</b>	<b>20 - 29%</b>	<b>30 - 35%</b>	<b>36 - 40%</b>	<b>&gt;40%</b>
Dry Matter	% of total	18	26	33	38	46
Crude Protein	% of DM	8.4	7.1	6.6	6.4	6.3
ADICP	% of DM	0.77	0.42	0.24	0.20	0.11
Available CP	% of DM	8.4	7.1	6.6	6.4	6.3
Soluble CP	% of CP	32	36	36	34	34
ADF	% of DM	37	28	23	22	19
NDF	% of DM	62	48	41	39	36
Fat	% of DM	2.1	2.5	2.8	2.9	3.0
Ash	% of DM	5.7	4.3	3.6	3.3	2.9
Lignin	% of DM	3.4	2.9	2.9	3.0	2.9
NEL	Mcal/lb	0.64	0.72	0.76	0.77	0.79
TDN	% of DM	66	69	72	72	73
NFC	% of DM	24.0	39.2	47.8	49.7	53.6
NDICP	% of DM	1.92	1.55	1.47	1.50	1.46
Lignin	% of NDF	5.46	6.12	7.10	7.73	8.16
ADICP	% of CP	9.14	5.86	3.62	3.18	2.00
NDICP	% of CP	23.4	22.2	22.5	23.4	23.4
Sugar	% of DM	2.5	2.1	1.7	1.6	1.4
Starch	% of DM	22.3	34.2	41.1	43.7	46.3
NSC	% of DM	24.8	36.3	42.8	45.3	47.7
Calcium	% of DM	0.31	0.23	0.19	0.18	0.15
Phosphorus	% of DM	0.28	0.25	0.24	0.24	0.24
Potassium	% of DM	1.7	1.2	1.0	0.9	0.8
Magnesium	% of DM	0.20	0.17	0.15	0.15	0.14
No. of Samples		39	214	150	44	14
% of All Samples		8%	46%	33%	10%	3%

Shaver, Randy. 2004. Harvest and Storage of High-Quality Corn Silage for Dairy Cows. UN. of Wisconsin Extension. <http://www.wisc.edu/dysci/uwex/nutritn/pubs/cshvst.PDF>