

Feeding Apples or Apple Pomace in Cattle Diets

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Apples and apple pomace can be fed to beef cattle. The composition of apples and apple pomace are shown in Table 1. Apples have an energy value similar to corn silage, but with less crude protein. Apple pomace has considerably less metabolizable energy (ME) content than corn silage and only serves as an energy replacement for poor to average quality hay.

Little information is available on feeding apples so a precautionary strategy would be to have a dietary inclusion rate less than 20%. Studies from the first half of the 20th century were concerned about ruminal parakeratosis (damage and clumping of the ruminal epithelium) when apples were fed at high levels. More information is available on feeding apple pomace. From 40-60 pounds (as-fed) can be given to beef cows daily. Apple pomace works better in diets of cows with low energy demands, such as the second trimester of pregnancy. The total diet should be evaluated so that it is formulated to provide adequate protein.

The economic values of apples and apple pomace as replacements for hay or corn at different prices are shown in Tables 2 and 3. Apple pomace is not priced relative to corn as its energy value is too low to use as a

replacement for corn. The prices in the tables represent the values on your farm and do not include transportation costs. Values for apple pomace and apples do not include adjustments for protein, as most forages in Michigan have excess protein content relative to the cow's requirements.

Table 1. Comparison of the nutrient profiles for apples and apple pomace with corn silage and corn (all nutrients except DM expressed on a DM basis)

	Apples	Apple pomace	Corn silage	Corn
Moisture, %	82.1	82.3	65.0	15.0
Dry matter, %	17.9	27.7	35.0	86.0
TDN, %	69.70	63.40	72.0	90.0
ME, Mcal/lb	1.15	0.65	1.18	1.48
Fat, %	2.20	2.60	3.10	4.1
Crude protein, %	2.80	4.30	8.70	9.8
Crude fiber, %	7.30	38.2	19.5	2.3
Calcium, %	0.06	0.15	0.25	0.03
Phosphorus, %	0.06	0.12	0.22	0.32
Potassium, %	0.78	0.58	1.14	0.44
Magnesium, %	0.28	0.07	0.18	0.12
Sulfur, %	0.06	0.11	0.12	.11
Sodium, %	0.06	0.01	0.01	.01

Table 2. Value of apples as a replacement for corn in cattle diets with various corn prices

\$/bu (as-is)	Value of corn			Value of apples	
	\$/ton (as-is)	\$/ton DM	\$/Mcal ME/cwt	Equiv. price \$/ton DM	\$/ton (as-is)
3	107.10	126	.04	97.91	17.53
4	142.80	168	.06	130.54	23.37
5	178.50	210	.07	163.18	29.21
6	214.20	252	.09	195.81	35.05
7	249.90	294	.10	228.45	40.89

*Corn DM = 85%; apple DM = 18 %

Table 3. Value of apples as a replacement for hay in cattle diets with various hay prices

\$/ton (as-is)	Value of hay		Value of apples		Value of apple pomace	
	\$/ton DM	\$/Mcal ME/cwt	Equiv. price \$/ton DM	\$/ton (as-is)	Equiv. price \$/ton DM	\$/ton (as-is)
60.00	68.18	.04	83.41	14.93	47.15	13.04
80.00	90.91	.05	111.22	19.91	62.86	17.38
100.00	133.64	.06	139.02	24.89	78.58	21.73
120.00	136.36	.07	166.83	29.86	94.29	26.07
140.00	159.09	.08	194.63	34.84	110.01	30.42

*Hay DM = 88%; apple DM = 18 %; apple pomace DM = 27.7 %