

Table 1. Diet analysis with Timothy hay only

	Hay Analysis	Per 26 lb	NRC 2007	Deficit
Digestible Energy	0.82 Mcal/lb	21.2 Mcal	27.5	6.3
Crude Protein	6.3%	743 g	906	163
Lysine	0.34%	40.1 g	39	
Calcium	0.39%	46 g	41	
Phosphorous	0.24%	28.3 g	25	
Magnesium	0.11%	13 g	13.6	
Sodium	0.029%	3.4 g	21	17.6
Iron	131 ppm	1548 mg	472	
Copper	6 ppm	71 mg	118	47
Iodine	Not analyzed			
Manganese	51 ppm	603 mg	472	
Selenium	<0.01 ppm			
Zinc	12 ppm	142 mg	472	330
Simple sugars	6.3%			
Starch	0.6%			
Fat	2%			
Ca:P	1.6		1.6	
Ca:Mg	3.5		3.0	
Fe:Cu	22		4.0	
Zn:Cu	2.0		4.0	

Table 2. Diet analysis including hay and Kalm 'N EZ

	Kalm 'N EZ	Per 7 lb	Hay Per 26 lb	Total Ration	NRC 2007	Deficits
Digestible Energy	1.3 Mcal/lb	9.1 Mcal	21.2 Mcal	30.3	27.5	
Crude Protein	14.9%	473 g	743 g	1216	907	
Lysine*	0.75%	23.8 g	40.1 g	63.9	39	
Calcium	0.96%	30.5 g	46 g	76.5	41	
Phosphorous	0.63%	20 g	28.3 g	48.3	25	
Magnesium	0.32%	10.2 g	13 g	23.2	13.6	
Sodium	0.25%	7.9 g	3.4 g	11.3	21	10
Iron	500 ppm	1591 mg	1548 mg	3139	472	
Copper	81 ppm	258 mg	71 mg	329	118	
Iodine*	1.1 ppm	3.5 mg		3.5	4.1	0.6
Manganese	150 ppm	477 mg	603 mg	1080	472	
Selenium*	0.6 ppm	1.9 mg		1.9	1.2	
Zinc	237 ppm	754 mg	142 mg	896	472	
Simple sugars	6.1%					
Starch	9.7%					
Fat	9.7%					
Ca:P	1.5			1.6	1.6	
Ca:Mg	3.0			3.3	3.0	
Fe:Cu	6.2			9.5	4.0	
Zn:Cu	2.9			2.7	4.0	

Table 3. Diet analysis including hay, Kalm 'N EZ and Essential K

	Essential K per 1.25 lb	K N' EZ Per 7 lb	Hay Per 26 lb	Total Ration	NRC 2007	Deficits
Digestible Energy	1.7 Mcal	9.1 Mcal	21.2 Mcal	32	27.5	
Crude Protein	159 g	473 g	743 g	1375	907	
Lysine*	12.5 g	23.8 g	40.1 g	76.4	39	
Calcium	14.2 g	30.5 g	46 g	90.7	41	
Phosphorous	8.5 g	20 g	28.3 g	56.8	25	
Magnesium	2.3 g	10.2 g	13 g	25.5	13.6	
Sodium	5.7 g	7.9 g	3.4 g	17	21	4
Iron	511 mg	1591 mg	1548 mg	3650	472	
Copper	114 mg	258 mg	71 mg	443	118	
Iodine*	0.8 mg	3.5 mg		4.3	4.1	
Manganese	136 mg	477 mg	603 mg	1216	472	
Selenium*	0.2 mg	1.9 mg		2.1	1.2	
Zinc	227 mg	754 mg	142 mg	1123	472	
NSC	13.3%					
Fat	6%					
Ca:P	1.7			1.6	1.6	
Ca:Mg	6.3			3.6	3.0	
Fe:Cu	4.5			8.2	4.0	
Zn:Cu	2.0			2.5	4.0	

Table 4: Notes and comments in reference to Tables 1-3

Hay Analysis (Table 1):

Analysis “as fed”; mature weight 1300 lb = 591 kg; feed at 2% BW; no pasture; NRC 2007 moderate workload

Diet is deficient in calories and protein, sodium, copper, zinc and selenium

Important ratios: Ca:P = 1.63; Ca:Mg = 3.55; Fe:Cu = 21.8

Ca:Mg high but acceptable for adult horses; Ca:P within limits

Fe:Cu:Zn:Mn = 1548:71:142:603 = 22:1:2:8.5; tolerable upper limit for Fe:Cu = 10:1; NRC recommendation Fe:Cu = 4:1

Simple sugars = ethanol soluble carbohydrates (ESC)

Iodine concentration not determined; selenium below detection levels (< 0.01 ppm)

Total Diet with Kalm ‘N EZ (Table 2):

Kalm ‘N EZ analysis composite sample from 3 bags; analysis reported “as fed” or “as sampled”; marketed as low sugar (ESC = ethanol soluble carbohydrates), low starch feed; moderately high fat content; Equi-analytical Package 603

Calories and protein deficits balanced

Add 15 g Mg as MgO (25 grams) to reduce Ca:Mg ratio to 2:1

Add 10 grams Na as NaCl (25 grams)

Fe:Cu:Zn:Mn = 3139:329:896:1080 = 9.5:1:2.7:3.2; add 100 mg Zn as zinc polysaccharide (450 mg) to increase Cu:Zn = 1:3

Cu and Zn at least 150% x NRC; Fe:Cu < 10:1

Lysine, iodine and selenium concentrations for Kalm ‘N EZ are minimum values from guaranteed analysis

Total Diet with Kalm ‘N EZ and Essential K (Table 3):

Nutrients listed are minimum values from guaranteed analysis

NSC = Nonstructural carbohydrates, which consist primarily of WSC (water soluble carbohydrates) + starch; for more information on measurements of NSC, ESC and WSC link to Fall 2015 newsletter from Equi-analytical:

[http://equi-analytical.com/wp-content/uploads/2015/11/Equi-Analytical Newsletter Fall 2015.pdf](http://equi-analytical.com/wp-content/uploads/2015/11/Equi-Analytical%20Newsletter%20Fall%202015.pdf)

Additional supplementation with Essential K unnecessary for balanced diet at moderate workload