Typical Composition of Feeds for Cattle and Sheep, 2004

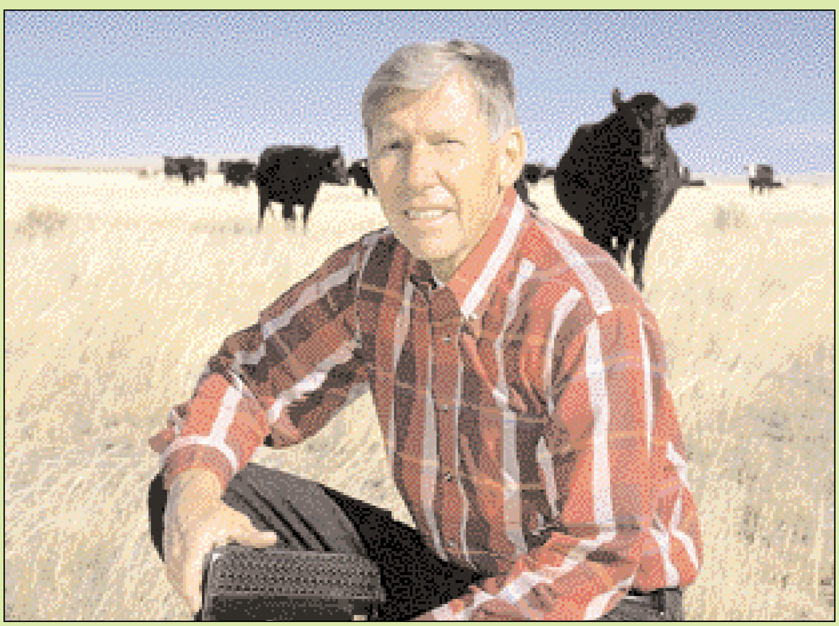
Accompanying this discussion is a table showing the typical composition of feedstuffs and ingredients commonly used in the feeding of cattle and sheep in North America. What is the purpose of this information? Nutrition research spanning more than 100 years has defined the nutrients required by animals. Using this information, diets can be formulated from feedstuffs and ingredients to meet these requirements with the expectation that animals will not only remain healthy but will also be productive and efficient. The ultimate goal of feedstuff analysis is to predict the productive response of animals when they are fed diets of a given composition. This is the real reason for information on feedstuff composition.

Table composition values

Feedstuffs are not of constant composition. Unlike chemicals that are "chemically pure" and therefore have a constant composition, feeds vary in their composition for many reasons. What is the value, then, of showing composition data for feedstuffs?

No one will argue that an actual analysis of a feed to be used in a diet is much more accurate than the use of tabulated composition data. Actual analysis should be obtained and used whenever possible.

Often, however, it is either impossi-



Editor's Note: Since 1957, R.L. Preston has taught and conducted animal nutrition research in the areas of protein, minerals, growth and body composition. He also has conducted cattle feeding research on the energy value of feeds, growth promotants and nutrition management.

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Feeds affected by the BSE feed regulation

Because of the threat of bovine spongiform encephalopathy (BSE), the Food and Drug Administration (FDA) has issued regulations that affect the feeding of certain feeds to ruminants (cattle and sheep) as a precautionary measure to help prevent this disease in the U.S. Blood meal, bone meal, meat-and-bone meal and poultry litter are the regulated feeds. Therefore, poultry litter has been removed from this feed table, since ruminant protein feeds can be fed to poultry and feed waste can become incorporated into poultry litter. Blood meal, bone meal and meat-and-bone meal can be fed to ruminants only if it is derived from swine or poultry. Therefore, the description for these feeds in the feed table has been changed to reflect this requirement. ♦

ble to determine actual composition or there is insufficient time to obtain such analysis. Therefore tabulated data are the next best source of information.

In using tabulated data, understand that feeds vary in their composition. Using the data shown in the accompanying table, one can expect the organic constituents (e.g., crude protein, ether extract, crude fiber, acid detergent fiber and neutral detergent fiber) to vary as much as ±15%, the mineral constituents to vary as much as ±30% and the energy values to vary up to ±10%. Therefore, values shown can only be guides.

For this reason they are called "typical values." They are not averages of published information since judgment was used in arriving at some of the values in the hope these values will be realistic for use in formulating diets.

New crop varieties usually result in nutrient composition changes. Crops modified through genetic engineering will result in feeds with generally improved nutrient content and availability and/or decreased anti-nutrient factors.

Chemical constituents vs. biological attributes

Feeds can be chemically analyzed for many things that may or may not be related to the response of an animal when fed the feed. Thus, in the accompanying table, certain chemical constituents are shown. The response of cattle and sheep when fed a feed, however, can be termed the biological response to the feed that is a function of its chemical composition and the ability of the animal to derive useful nutrient value from the feed.

The latter relates to the digestibility or availability of a nutrient in the feed for absorption into the body and its ultimate efficiency of use depending upon the nutrient status of the animal and the productive or physiological function being performed by the animal. Thus, ground fence posts and shelled corn may have the same gross energy value but have markedly different useful energy value [total digestible nutrients (TDN) or net energy] when consumed by the animal.

Therefore, biological attributes of a feed have much greater meaning in predicting the productive response of animals but are more difficult to accurately determine because there is an interaction between the chemical composition of a feed with the digestive and metabolic capabilities of the animal being fed. Biological attributes of feeds are more laborious and costly to determine and are more variable than chemical constituents. They are generally more predictive, however, since they relate to the response of an animal being fed the feed or diet.

Source of information shown in the table

Several sources of information were used in arriving at the "typical values" shown in the table. Where information was not available but a reasonable estimate could be made from similar feeds or stage of maturity, this has been done since it is not too helpful to have a table with considerable missing information. Where zeros appear, the amount is so small that it can be considered insignificant in practical diet formulation. Blanks indicate that the value is unknown. The table this year contains revisions as well as values for feeds not included in previous tables.

Using information contained in the table

Feed names: The most obvious or commonly used feed names are given in the table. Feeds designated as "fresh" are feeds that are grazed or fed as fresh-cut materials.

Dry matter: Typical dry matter (DM) values are shown; however, the moisture content of feeds can vary greatly. Therefore, DM content can be the biggest reason for variation in feedstuff composition on an "as-fed basis." For this reason, chemical constituents and biological attributes of feeds shown in the table are on a DM basis.

Since DM can vary greatly and since one of the factors regulating total feed intake is the DM content of feeds, diet formulation on a DM basis is sounder than using "as-fed basis." If one wants to convert a value shown to an "as-fed basis," multiply the decimal equivalent of the DM content times the compositional value shown in the table.

Energy: Four measures of the energy value of feeds are shown in the table. TDN is shown because there are more determined TDN values for feeds, and because this has been the standard system for expressing the energy value of feeds for cattle and sheep.

There are several technical problems with TDN, however. The digestibility of crude fiber may be higher than for nitrogen-free extract in certain feeds. TDN also overestimates the value of roughages compared to concentrates in producing animals. Some have argued that energy is not measured in pounds or percent and therefore TDN is not a valid measure of energy. However, this is more a scientific argument than a criticism of the predictive value of TDN.

Digestible energy (DE) values are not included in the table. There is a constant relationship between TDN and digestible energy (DE) in cattle and sheep; DE (Mcal/cwt.) can be calculated by multiplying the %TDN content by 2. It should be apparent, therefore, that the ability of TDN and DE to predict animal performance is equal.

Interest in the use of net energy (NE) in evaluating feeds for cattle and sheep was renewed with the development of the California net energy system. The main reason for this is the improved predictability of results depending on whether feed energy is being used for maintenance (NEM), growth (NEG) or lactation (NEL). The major problem in using these NE values for growing cattle and sheep is predicting feed intake and, therefore, the proportion of feed that will be used maintenance and growth.

Some only use the NEG values but it should be obvious that this suffers the equal, but opposite, criticism mentioned for TDN; NEG will overestimate the feeding value of concentrates relative to roughages. The average of the two NE values can be used, but this would be true only for cattle and sheep eating twice their maintenance requirement.

The most accurate way to use these NE values to formulate diets would be to use the NEM value plus, a multiplier, times the NEG value, all divided by one plus the multiplier; the multiplier is the level of feed intake above maintenance relative to maintenance. For example, if 700-lb. cattle are expected to eat 18 lbs. of DM, 8 lbs. of which will be required for maintenance, then the NE value of the diet would be:

NE = [NEM + (10/8)(NEG)]/[1 + (10/8)]

Such a calculation can be easily introduced into computer programs designed to formulate diets and predict performance.

In deciding on the energy system to use, there is no question on the theoretical superiority of NE over TDN in predicting animal performance. This superiority is lost, however, if only NEG is used in formulating diets. If NE is used, some combination of NEM and NEG is required. NEL values are also shown. Few NEL values have actually been determined. However, NEL values are similar to NEM values except for very high and low energy feeds.

Protein: Crude protein (CP) values are shown for each feed, which are Kjeldahl nitrogen times 100/16 or 6.25, since proteins contain 16% nitrogen on the average. CP does not give any information on the actual protein and non-protein nitrogen content of a feed.

Digestible protein (DP) has been included in many tables of feed composition but because of the contribution of microbial and body protein to the protein in feces, DP is more misleading than CP. One can estimate DP from the CP content of the diet fed to cattle or sheep by the following equation: %DP = 0.9(%CP) -3; where %DP and %CP are the diet values on a DM basis.

Undegradable intake protein [(UIP) rumen "bypass" or escape protein] values are shown. This value represents the percent of CP that passes through the rumen without being degraded by the rumen microorganisms. Degradable intake protein (DIP) is the percent of CP that is degraded in the rumen and is equal to 100 minus UIP. Like other biological attributes, these values are not constant.

UIP values on many feeds have not been determined and reasonable estimates are difficult to make.

How should these values be used to improve the predictability of animal response when fed various feeds? Generally, DIP can supply CP up to 7% of the diet. If the CP required in the diet exceeds 7% of the DM, all CP above this amount should be UIP. In other words, if the final diet is to contain 13% CP, 6 of the 13 percentage units, or 46% of the CP should be in the form of UIP. Once the relationships between UIP and DIP have been better quantified, CP requirements may be lowered especially at higher CP levels. On diets high in rumen fermentable carbohydrate, DIP requirements may determine the total CP required in the diet.

Crude, acid detergent and neutral detergent fiber: After more than 125 years, crude fiber (CF) is declining in popularity as a measure of poorly digestible carbohydrates in feeds. CF's major problem is that variable amounts of lignin, which isn't digestible, are removed in the CF procedure. In the old scheme, the remaining carbohydrates [nitrogen-free extract; (NFE)] were thought to be more digestible than CF even though many feeds have been shown to have a higher digestibility for CF than NFE. One reason CF remained in the analytical scheme was its apparent requirement for the calculation of TDN.

Improved analytical procedures for fiber have been developed, namely acid detergent fiber (ADF) and neutral detergent fiber (NDF). ADF is related to digestibility and NDF is also somewhat related to voluntary intake and the availability of net energy. Both of these measures relate more directly to predicted animal performance and, therefore, are more valuable than CF. Lignification of NDF, however, alters availability of surface area to fiber digesting rumen microorganisms; therefore, lignin may be added to future tables.

Recently, effective NDF (eNDF) has been proposed to better describe the dietary fiber function in high-concentrate, feedlot-type diets. While eNDF is defined as the percent of NDF that is retained on a screen similar in size to particles that will pass from the rumen, this value is further modified based on feed density and degree of hydration.

Rumen pH is correlated with dietary eNDF when diets contain less than 26% eNDF. Thus when formulating high concentrate diets, including eNDF will help to prevent acidosis in the rumen.

Recommended eNDF levels for feedlot diets from range from 5 to 20% depending on bunk management, inclusion of ionophores, digestion of NDF and/or microbial protein synthesis in the rumen. Therefore, estimated eNDF values are shown for many feeds.

These values must be modified, however, depending on degree of feed processing (eg., chopping, grinding, pelleting) and hydration (fresh forage, silages, high-moisture grains) if these feed forms are not specified in the table.

Ether extract: Ether extract (EE) shows the crude fat content of the feed.

Minerals: Values are shown for only certain minerals. Calcium (Ca) and phosphorus (P) are important minerals to consider in most feeding situations. Potassium (K) becomes more important as the level of concentrate increases and when non-protein nitrogen is substituted for intact protein in the diet.

Sulfur (S) also becomes more important as the level of non-protein nitrogen increases in the diet; high S levels in diets compounded by high S levels in drinking water can be detrimental. Zinc (Zn) is shown because it is less variable and is more generally near a deficient level in cattle and sheep diets. Chlorine (Cl) is of increasing interest for its role in dietary acid-base relationships.

Several other minerals could logically be included in the table. The level of many trace minerals in feeds is largely determined by the level in the soil on which the feeds are grown or other environmental factors that preclude showing a single value in a table of feed composition.

Iodine and selenium are required nutrients that may be deficient in many diets, yet their level in feed is more related to the conditions under which the feed is grown than to a characteristic of the feed itself. Trace-mineralized salt and trace mineral premixes are generally used to supplement trace minerals. The use of these supplements is encouraged where there are known deficiencies of certain trace minerals.

Vitamins: Vitamins have been omitted from the table. The only vitamin of general practical importance in cattle and sheep feeding is the vitamin A value (vitamin A and carotene) in feeds that depend largely on maturity and conditions at harvest, and the length and conditions of storage. Therefore, it is probably unwise to rely entirely on harvested feeds as a source of vitamin A value.

Where roughages are being fed that contain good green color or are being fed as immature fresh forages (e.g., pasture), there will probably be sufficient vitamin A value to meet the animal's requirement. Other vitamins, if required, should be supplied as supplements.

Future revisions, additions and deletions

A table of feed composition is of value only if it is relatively complete, contains feeds commonly fed and the data are updated with new compositional values. I welcome suggestions and compositional data to keep this table useful to the cattle and sheep feeding industry. When sending compositional data, please adequately describe the feed, indicate the dry matter or moisture content and whether analytical values are given on an as-fed or dry-matter basis. If more than one sample of a feedstuff was analyzed, the number of samples analyzed should be indicated. ♦

(All values except dry matter are shown on a dry matter basis)

FEEDSTUFF	DM	TDN	NE_M	NE_G	NE_L	CP	BYPASS	CF	ADF	NDF	eNDF	EE	ASH	CA	P	K	CL	S	ZN
		ENERGY				PROTEIN		FIBER											
	%	%	Mcal/cwt.			%	%	%	%	%	%	%	%	%	%	%	%	%	ppm
Alfalfa Cubes	91	57	57	25	57	18	30	29	36	46	40	2.0	11	1.30	0.23	1.9	0.37	0.35	20
Alfalfa Dehydrated 17% CP	92	61	62	31	61	19	60	26	34	45	6	3.0	11	1.42	0.25	2.5	0.45	0.24	21
Alfalfa Fresh	24	61	62	31	61	19	18	27	34	46	41	3.0	9	1.35	0.27	2.6	0.40	0.28	18
Alfalfa Hay Early Bloom	90	59	59	28	59	19	20	28	35	45	92	2.5	8	1.41	0.26	2.5	0.38	0.27	22
Alfalfa Hay Midbloom	89	58	58	26	58	17	23	30	36	47	92	2.3	9	1.40	0.24	2.0	0.38	0.26	24
Alfalfa Hay Full Bloom	88	54	54	20	54	16	25	34	40	52	92	2.0	8	1.20	0.23	1.7	0.37	0.23	23
Alfalfa Hay Mature	88	50	50	12	49	13	30	38	45	59	92	1.3	8	1.18	0.19	1.5	0.35	0.20	23
Alfalfa Seed Screenings	91	84	92	61	87	34		13	15			10.5	6	0.30	0.67				
Alfalfa Silage	30	55	55	21	55	18	19	28	37	49	82	3.0	9	1.40	0.29	2.6	0.41	0.29	26
Alfalfa Silage Wilted	39	58	58	26	58	18	22	28	37	49	82	3.0	9	1.40	0.29	2.6	0.41	0.29	26
Alfalfa Leaf Meal	89	69	71	43	70	28	15	15	25	34	35	2.7	15	2.88	0.34	2.2		0.32	39
Alfalfa Stems	89	47	47	7	46	11	44	44	51	68	100	1.3	6	0.90	0.18	2.5			
Almond Hulls	89	59	59	28	59	5	60	16	27	35	100	3.3	7	0.25	0.10	2.0	0.03	0.07	20
Ammonium Chloride	99	0	0	0	0	163	0	0	0	0	0	0.0		0.00	0.00	0.0	66.00	0.00	0
Ammonium Sulfate	99	0	0	0	0	132	0	0	0	0	0	0.0						24.15	
Apple Pomace Wet	20	68	70	41	69	6	10	17	34	40	34	5.6	4	0.14	0.14	0.6		0.06	11
Apple Pomace Dried	89	65	66	37	66	5	15	19	35	45	34	5.2	4	0.13	0.12	0.5		0.02	
Artichoke Tops (Jerusalem)	27	61	62	31	61	6		18	30	41	40	1.1	10	1.62	0.11	1.4			
Avocado Seed Meal	91	52	52	16	51	20		19	24			1.2	16						
Bahiagrass Hay	90	51	51	14	50	8	37	32	41	72	98	1.9	8	0.48	0.20	1.4		0.21	
Bakery Product Dried	90	90	100	68	94	12	30	4	6	14	0	11.0	4	0.18	0.28	0.3	2.25	0.15	33
Barley Hay	90	57	57	25	57	9		28	37	65	98	2.1	8	0.30	0.28	1.6		0.19	25
Barley Silage	35	59	58	26	58	12	22	34	37	58	61	3.0	9	0.46	0.30	2.4		0.22	28
Barley Silage Mature	35	58	58	26	58	12	25	30	34	50	61	3.5	9	0.30	0.20	1.5		0.15	25
Barley Straw	90	43	44	0	42	4	70	42	52	78	100	1.9	7	0.33	0.08	2.1	0.67	0.16	7
Barley Grain	89	84	92	61	87	12	28	5	7	19	34	2.1	3	0.06	0.38	0.6	0.18	0.16	23
Barley Grain, Steam-Flaked	85	90	100	70	100	12	39	5	7	19	30	2.1	3	0.06	0.35	0.6	0.18	0.16	23.00
Barley Grain, Steam-Rolled	86	84	92	61	87	12	38	5	7	19	27	2.1	3	0.06	0.41	0.6	0.18	0.17	30
Barley Grain 2-row	87	84	92	61	87	12		6	8	24	34	2.3	2	0.05	0.31	0.6	0.18	0.17	
Barley Grain 6-row	87	84	92	61	87	11		6	8	24	34	2.2	3	0.05	0.36	0.6	0.18	0.15	
Barley Grain Lt.Wt. (42-44 lbs./bu.)	88	78	83	54	80	13	30	9	12	30	34	2.3	4						
Barley Feed Pearl By-product	90	73	77	48	75	15		12	15			3.9	5	0.05	0.45	0.7		0.06	
Barley Grain Screenings	89	77	82	53	79	12		9	11			2.6	4	0.30	0.33	0.7		0.15	
Beans Navy Cull	90	84	92	61	87	24	25	5	8	20	0	1.4	5	0.15	0.59	1.4	0.06	0.26	45
Beet Pulp Wet	17	76	81	52	78	11	35	20	23	48	33	0.7	6	0.68	0.08	1.4	0.40	0.21	20
Beet Pulp Dried	91	75	79	50	77	11	44	21	21	41	33	0.7	6	0.65	0.08	1.4	0.40	0.22	22
Beet Pulp Wet with Molasses	24	77	82	53	79	11	25	16	21	39	33	0.6	6	0.60	0.10	1.8		0.42	11

	ENERGY					PROTEIN		FIBER											
FEEDSTUFF	DM	TDN	NE_M	NE_G	NE_L	CP	BYPASS	CF	ADF	NDF	eNDF	EE	ASH	CA	P	K	CL	S	ZN
	%	%	Mcal/cwt.			%	%	%	%	%	%	%	%	%	%	%	%	%	ppm
Beet Pulp Dried with Molasses	92	76	81	52	78	11	34	17	22	40	33	0.6	6	0.60	0.10	1.8		0.42	11
Beet Tops (Sugar)	20	58	58	26	58	14		10	14	25	41	1.5	24	1.20	0.23	5.1	0.20	0.45	20
Beet Top Silage	25	52	52	16	51	12		12				2.0	32	1.38	0.22	5.7		0.57	20
Bermudagrass Coastal Dehydrated	90	62	63	33	63	16	40	26	29	40	10	3.8	7	0.40	0.25	1.8		0.23	18
Bermudagrass Coastal Hay	89	56	56	23	56	10	20	30	36	73	98	2.1	6	0.47	0.21	1.5		0.22	16
Bermudagrass Hay	89	53	53	18	53	10	18	30	39	78	98	1.9	8	0.46	0.20	1.5		0.25	33
Bermudagrass Silage	26	50	50	12	49	10	15	30	37	77	48	1.9	8	0.46	0.20	1.5		0.25	33
Birdsfoot Trefoil Fresh	22	66	68	38	67	21	20	21	31	47	41	4.4	9	1.78	0.25	2.6		0.25	31
Birdsfoot Trefoil Hay	89	57	57	25	57	16	22	31	38	50	92	2.2	8	1.73	0.24	1.8		0.25	28
Biuret	99	0	0	0	0	248	0	0	0	0	0	0.0	0	0.00	0.00	0.0	0.00	0.00	0
Blood Meal, Swine/Poultry	91	66	68	38	67	92	80	1	2	10	0	1.4	3	0.32	0.28	0.2	0.30	0.70	22
Bluegrass KY Fresh Early Bloom	36	69	71	43	70	15	20	27	32	60	41	3.9	7	0.37	0.30	1.9	0.42	0.19	25
Bluegrass Straw	93	45	45	3	44	6		40	50	78	90	1.1	6	0.20	0.10				
Bluestem Fresh Mature	61	50	50	12	49	6		34				2.5	5	0.40	0.12	0.8		0.05	28
Bone Meal Steamed, Swine/Poultry	95	16	27	0	11	13		1	0	0	0	11.6	77	27.00	12.74	0.2		2.50	290
Bread By-product	68	91	102	69	95	14	24	1	2	3	0	3.2	3	0.09	0.18	0.2	0.76	0.15	40
Brewers Grains Wet	23	85	93	62	88	26	52	13	21	44	18	7.6	4	0.29	0.61	0.1	0.15	0.32	78
Brewers Grains Dried	92	84	92	61	87	24	54	14	24	50	18	9.2	4	0.29	0.60	0.1	0.15	0.32	78
Brewers Yeast Dried	94	79	85	55	81	48		3				1.0	7	0.10	1.56	1.8		0.41	41
Bromegrass Fresh Immature	30	64	65	36	65	15	22	28	33	54	40	4.1	10	0.45	0.34	2.3		0.21	20
Bromegrass Hay	89	55	55	21	55	10	33	35	41	66	98	2.3	9	0.40	0.23	1.9	0.40	0.18	19
Bromegrass Haylage	35	57	57	25	57	11	26	36	44	69	61	2.5	8	0.38	0.30	2.0		0.20	19
Buckwheat Grain	88	77	82	53	79	12		12	17			2.8	2	0.11	0.36	0.5	0.05	0.16	10
Buttermilk Dried	92	88	98	65	91	34	0	5	0	0	0	5.0	10	1.44	1.00	0.9		0.09	44

FEEDSTUFF	DM	ENERGY TDN	NE_M	NE_G	NE_L	PROTEIN CP	BYPASS	FIBER CF	ADF	NDF	eNDF	EE	ASH	CA	P	K	CL	S	ZN
	%	%	Mcal/cwt.			%	%	%	%	%	%	%	%	%	%	%	%	%	ppm
Cactus	26	63	64	34	64	5		18	23	29		2.1	17	3.50	0.10	1.7		0.20	
Calcium Carbonate	99	0	0	0	0	0		0	0	0	0	0.0	99	38.50	0.04	0.1		0.00	0
Canarygrass Hay	91	53	53	18	53	9	26	32	34	67	98	2.7	8	0.38	0.25	2.7		0.14	18
Canola Meal Solvent	90	71	74	46	73	40	30	12	20	29	23	4.0	8	0.75	1.16	1.3	0.07	0.78	68
Carrot Pulp	14	62	63	33	63	6		19	23	40	0	7.8	9						
Carrot Root Fresh	12	83	90	60	86	10		9	11	20	0	1.4	10	0.60	0.30	2.4	0.50	0.17	
Carrot Tops	16	73	77	48	75	13		18	23	45	41	3.8	15	1.94	0.19	1.9			
Cattle Manure Dried	92	38	40	0	36	17		34	37	55	0	2.6	14	1.35	1.00	0.6		1.78	240
Cheatgrass Fresh Immature	21	68	70	41	69	16		23				2.7	10	0.60	0.28				
Citrus Pulp Dried	90	79	85	55	81	7	38	13	18	21	33	2.2	7	1.81	0.12	0.8	0.04	0.08	14
Clover Ladino Fresh	19	69	71	43	70	25	20	14	33	35	41	4.8	11	1.27	0.38	2.4		0.20	20
Clover Ladino Hay	90	61	62	31	61	21	25	22	32	36	92	2.0	9	1.35	0.32	2.4	0.30	0.20	17
Clover Red Fresh	24	64	65	36	65	18	21	24	33	44	41	4.0	9	1.70	0.30	2.0	0.60	0.17	23
Clover Red Hay	88	55	55	21	55	15	28	30	39	51	92	2.5	8	1.50	0.25	1.7	0.32	0.17	17
Clover Sweet Hay	91	53	53	18	53	16	30	30	38	50	92	2.4	9	1.27	0.25	1.8	0.37	0.46	
Coconut Meal	92	71	74	46	73	21	56	12	22	56	23	6.7	7	0.63	0.21	0.6	0.33	0.04	
Coffee Grounds	88	20	36	0	16	13		41	68	77	10	15.0	2	0.10	0.08				
Corn Whole Plant Pelleted	91	63	64	34	64	9	45	21	24	40	6	2.4	6	0.50	0.24	0.9		0.14	
Corn Fodder	80	67	69	40	68	9	45	25	29	48	100	2.4	7	0.50	0.25	0.9	0.20	0.14	
Corn Stover Mature (Stalks)	80	59	59	28	59	5	30	35	44	70	100	1.3	7	0.35	0.19	1.1	0.30	0.14	22
Corn Silage Milk Stage	26	65	66		66	8	18	26	32	54	60	2.8	6	0.40	0.27	1.6		0.11	20
Corn Silage Mature Well Eared	34	72	75	47	74	8	28	21	27	46	70	3.1	5	0.28	0.23	1.1	0.20	0.12	22
Corn Silage Sweet Corn	24	65	66	37	66	11		20	32	57	60	5.0	5	0.24	0.26	1.2	0.17	0.16	39
Corn Grain, Whole	88	88	98	65	91	9	58	2	3	9	60	4.3	2	0.02	0.30	0.4	0.05	0.12	18
Corn Grain, Rolled	88	88	98	65	91	9	54	2	3	9	34	4.3	2	0.02	0.30	0.4	0.05	0.12	18
Corn Grain, Steam Flaked	85	93	104	71	97	9	59	2	3	9	40	4.1	2	0.02	0.27	0.4	0.05	0.12	18
Corn Grain, High Moisture	74	93	104	71	97	10	42	2	3	9	0	4.0	2	0.02	0.30	0.4	0.06	0.13	20
Corn Grain, High Oil	88	91	102	69	95	8	54	2	3	8	60	6.9	2	0.01	0.30	0.3	0.05	0.13	18

FEEDSTUFF	DM	TDN	NE_M	NE_G	NE_L	CP	BYPASS	CF	ADF	NDF	eNDF	EE	ASH	CA	P	K	CL	S	ZN
		ENERGY				PROTEIN		FIBER											
	%	%	Mcal/cwt.			%	%	%	%	%	%	%	%	%	%	%	%	%	ppm
Corn Grain, Hi-Lysine	92	87	96	64	90	12	58	4	4	11	60	4.4	2	0.03	0.24	0.4	0.05	0.11	18
Corn and Cob Meal	87	82	89	59	85	9	52	9	10	26	56	3.7	2	0.06	0.28	0.5	0.05	0.13	16
Corn Cobs	90	48	48	9	47	3	50	36	39	88	56	0.5	2	0.12	0.04	0.8		0.40	5
Corn Screenings	86	91	102	69	95	10	52	3	4	9	20	4.3	2	0.04	0.27	0.4	0.05	0.12	16
Corn Bran	91	76	81	52	78	11		10	17	51	0	6.3	3	0.04	0.15	0.1	0.13	0.08	18
Corn Gluten Feed	90	80	86	56	83	22	25	9	12	40	36	3.2	7	0.12	0.85	1.3	0.25	0.33	84
Corn Gluten Meal 41% CP	91	85	93	62	88	46	58	5	9	32	23	3.2	3	0.13	0.55	0.2	0.07	0.55	35
Corn Gluten Meal 60% CP	91	89	99	67	93	67	60	4	6	11	23	2.6	3	0.06	0.54	0.2	0.10	0.82	40
Corn Cannery Waste	29	68	70	41	69	8	15	28	36	59	0	3.0	5	0.10	0.29	1.0		0.13	25
Cottonseed, Whole	91	95	107	73	99	23	38	29	39	47	100	17.8	4	0.14	0.64	1.1	0.06	0.24	34
Cottonseed, Whole, Extruded	92	87	98	67	91	26	50	32	44	53	33	9.5	5	0.17	0.68	1.3		0.24	38
Cottonseed, Whole, Delinted	90	95	107	73	99	24	39	20	29	40	100	22.2	4	0.13	0.55	1.2		0.24	36
Cotton Gin Trash (Burrs)	91	42	43	0	40	10		34	51	70	100	2.0	14	1.70	0.25	1.9		0.14	25
Cottonseed Hulls	90	45	45	3	44	5	45	48	68	87	100	1.9	3	0.15	0.08	1.1	0.02	0.05	10
Cottonseed Meal, CP Mech. 41%	92	80	86	56	83	46	50	13	18	31	23	5.0	7	0.21	1.19	1.7	0.05	0.42	64
Cottonseed Meal, Solvent 41% CP	90	77	82	53	79	48	42	13	17	25	23	1.8	7	0.22	1.25	1.7	0.05	0.44	66
Crab Waste Meal	91	29	37	0	30	32	65	11	13			3.0	43	15.00	1.88	0.5	1.63	0.27	107
Crambe Meal, Solvent	91	81	88	58	84	31	45	25	35	47	23	1.4	8	1.27	0.86	1.1	0.70	1.26	44
Crambe Meal, Mech.	92	88	98	65	91	28	50	24	33	42	25	17.0	7	1.22	0.78	1.0	0.65	1.18	41
Cranberry Pulp Meal	88	49	49	11	48	7		26	47	54	33	15.7	2						
Crawfish Waste Meal	94	25	36	0	29	35	74		15				42	13.10	0.85				
Curacao Phosphate	99	0	0	0	0	0		0	0	0	0	0.0	95	34.00	15.00				
Defluorinated Phosphate	99	0	0	0	0	0		0	0	0	0	0.0	95	32.60	18.07	1.0			100
Diammonium Phosphate	98	0	0	0	0	115	0	0	0	0	0	0.0	35	0.52	20.41	0.0		2.16	
Dicalcium Phosphate	96	0	0	0	0	0		0	0	0	0	0.0	94	22.00	18.65	0.1		1.00	70
Distillers Grains, Wet	25	90	100	68	94	28	52	8	18	40	4	9.6	6	0.28	0.78	1.2	0.28	0.40	95
Distillers Grain, Barley	90	77	82	53	79	30	56	18	22	45	4	3.7	4	0.15	0.67	1.0	0.18	0.43	50
Distillers Grain, Corn, Dry	91	95	107	73	99	29	60	8	21	44	4	10.5	4	0.15	0.78	0.9	0.14	0.45	65
Distillers Grain, Corn, Wet	36	95	107	73	99	29	55	8	21	43	4	10.5	4	0.15	0.78	0.9	0.14	0.45	65
Distillers Grain, Corn with Solubles	90	92	103	70	96	29	50	9	17	43	4	10.6	6	0.28	0.79	1.0	0.18	0.39	80
Distillers Corn Stillage	7	92	103	70	96	22	55	8	10	21	0	8.1	5	0.14	0.72	0.2		0.60	60
Distillers Grain, Sorghum, Dry	91	87	96	64	90	32	62	13	22	44	4	10.0	3	0.22	0.63	0.3		0.45	50
Distillers Grain, Sorghum, Wet	35	87	96	64	90	32	55	13	22	44	4	10.0	3	0.22	0.63	0.3		0.45	50
Distillers Grain, Sorghum with Solubles	92	85	93	62	88	31	53	13	19	47	4	10.0	3	0.25	0.65	0.5		0.40	55
Distillers Dried Solubles	93	88	98	65	91	29	0	4	7	22	4	9.2	7	0.33	1.38	1.8	0.28	0.40	91
Elephant (Napier) grass hay, chopped	92	55	55	21	54	9		24	46	63	85	2.0	10	0.35	0.30	1.3		0.10	
Fat, Animal, Poultry, Vegetable	99	195	285	230	285	0		0	0	0	0	99.0	0	0.00	0.00	0.0			
Feather Meal Hydrolyzed	92	69	71	43	70	86	73	2	16	44	23	6.5	4	0.60	0.62	0.2	0.30	1.85	95
Fescue KY 31 Fresh	29	64	65	36	65	15	20	25	32	64	40	5.5	9	0.48	0.37	2.5		0.18	22
Fescue KY 31 Hay Early Bloom	88	65	66	37	66	18	22	25	31	64	98	6.6	8	0.45	0.37	2.7		0.24	24
Fescue KY 31 Hay Mature	88	52	52	16	51	11	30	30	42	73	98	5.0	6	0.45	0.26	1.7		0.14	22
Fescue (Red) Straw	94	43	44	0	41	4		41				1.1	6	0.00	0.06				
Fish Meal	90	74	78	49	76	66	60	1	2	12	10	8.0	20	5.50	3.15	0.7	0.76	0.80	130
Garbage Municipal Cooked	23	80	86	56	83	16		9	50	59	30	20.0	10	1.20	0.43	0.6	0.67		
Grain Screenings	90	65	66	37	66	14		14				5.5	9	0.25	0.34				30
Grain Dust	92	73	77	48	75	10		11				2.2	10	0.30	0.18				42
Grape Pomace Stemless	91	30	38	0	27	12	45	32	48	53	34	7.5	9	0.50	0.08	0.5	0.01		24
Grass Hay	88	58	58	26	58	10	30	33	41	63	98	3.0	6	0.60	0.21	2.0		0.20	28
Grass Silage	30	61	62	31	61	11	24	32	39	60	61	3.4	8	0.70	0.24	2.1		0.22	29
Guar Meal	90	72	75	47	74	39	34	16				3.9	5						
Hominy Feed	90	89	99	67	93	11	48	5	7	21	9	6.1	3	0.04	0.54	0.6	0.06	0.10	32
Hop Leaves	37	49	49	11	48	15		15				3.6	35	2.80	0.64				
Hop Vine Silage	30	53	53	18	53	15		21	24			3.1	20	3.30	0.37	1.8		0.22	44
Hops Spent	89	37	40	0	35	23		26	30			4.5	7	1.60	0.60				
Kelp Dried	91	32	38	0	29	7		7	10			0.5	39	2.72	0.31				
Kenaf Hay	92	48	48	9	47	10		31	44	56	98	2.9	12						

FEEDSTUFF	DM	ENERGY TDN	NE$_M$	NE$_G$	NE$_L$	PROTEIN CP	BYPASS	FIBER CF	ADF	NDF	eNDF	EE	ASH	CA	P	K	CL	S	ZN
	%	%	Mcal/cwt.			%	%	%	%	%	%	%	%	%	%	%	%	%	ppm
Kochia Fresh	29	55	55	21	55	16		23				1.2	18	1.10	0.30				
Kochia Hay	90	53	53	18	53	14		27				1.7	14	1.00	0.20				
Kudzu Hay	90	54	54	20	54	16		33				2.6	7	3.00	0.23				
Lespedeza, Fresh Early Bloom	25	60	60	30	60	16	50	32				2.0	10	1.20	0.24	1.1		0.21	
Lespedeza Hay	92	54	54	20	54	14	60	30				3.0	7	1.10	0.22	1.0		0.19	29
Limestone Ground	98	0	0	0	0	0	0	0	0	0	0	0.0	98	34.00	0.02			0.03	
Limestone Dolomitic Ground	99	0	0	0	0	0	0	0	0	0	0	0.0	98	22.30	0.04	0.4			
Linseed Meal Solvent	91	76	81	52	78	39	36	10	18	25	23	1.9	6	0.43	0.93	1.5	0.04	0.47	60
Meadow Hay	90	50	50	12	49	7	23	33	44	70	98	2.5	9	0.61	0.18	1.6		0.17	24
Meat Meal, Swine/Poultry	93	71	74	46	73	56	64	2	7	48	0	10.5	24	9.00	4.42	0.5	1.27	0.48	190
Meat and Bone Meal, Swine/Poultry	93	72	75	47	74	56	24	1	5	34	0	10.0	29	13.50	6.50				
Milk, Dry, Skim	94	87	96	64	90	36	0	0	0	0	0	1.0	8.4	1.36	1.09	1.7	0.96	0.34	41
Mint Slug Silage	27	55	55	21	55	14		24				1.8	16	1.10	0.57				
Molasses Beet	77	75	79	50	77	9	0	0	0	0	0	0.2	12	0.12	0.03	6.0	1.64	0.60	18
Molasses Cane	76	75	79	50	77	6	0	0	0	0	0	0.8	12	0.97	0.10	3.7	2.50	0.55	25
Molasses Cane Dried	94	74	78	49	76	9	0	2	3	7	0	0.3	14	1.10	0.15	3.6	3.00	0.47	30
Molasses, Cond. Fermentation Solubles	46					80							16		0.25			12.60	
Molasses Citrus	65	77	82	53	79	10	0	0	0	0	0	0.3	8	1.90	0.17	0.2	0.11	0.23	137
Molasses Wood, Hemicellulose	61	76	81	52	78	1	0	1	2	4	0	0.7	9	1.30	0.09	0.1		0.05	
Monoammonium Phosphate	98	0	0	0	0	70	0	0	0	0	0	0.0	24	0.30	24.70	0.0		1.42	81
Mono-Dicalcium Phosphate	97	0	0	0	0	0		0	0	0	0	0.0	94	16.70	21.10	0.1		1.20	70
Oat Hay	90	54	54	20	54	10	25	31	39	63	98	2.3	8	0.40	0.27	1.6	0.42	0.21	28
Oat Silage	35	60	60	30	60	12	21	31	39	59	61	3.2	10	0.34	0.30	2.4	0.50	0.25	27
Oat Straw	91	48	48	9	47	4	40	41	48	73	98	2.3	8	0.24	0.07	2.4	0.78	0.22	6
Oat Grain	89	76	81	52	78	13	18	11	15	28	34	5.0	4	0.05	0.41	0.5	0.11	0.20	40
Oat Grain, Steam Flaked	84	88	98	65	91	13	26	11	15	30	32	4.9	4	0.05	0.37	0.5	0.11	0.20	40.00
Oat Groats	91	91	102	69	95	18	15	3				6.6	2	0.08	0.47	0.4	0.10	0.20	
Oat Middlings	90	90	100	68	94	17	20	3	4			6.0	3	0.06	0.48	0.5		0.23	
Oat Mill By-product	89	33	38	0	30	8		25	37			2.6	6	0.12	0.23	0.6		0.24	
Oat Hulls	93	40	42	0	38	4	25	32	40	75	90	1.5	7	0.16	0.15	0.6	0.08	0.14	31
Orange Pulp Dried	89	80	86	56	83	9		9	16	20	33	1.8	4	0.71	0.11	0.6		0.05	
Orchardgrass Fresh Early Bloom	24	65	66	37	66	14	23	30	32	54	41	4.0	9	0.33	0.39	2.7	0.08	0.20	21
Orchardgrass Hay	88	59	59	28	59	10	27	34	40	67	98	3.3	8	0.32	0.30	2.6	0.41	0.20	26
Pea Vine Hay	89	60	60	30	60	10		32	52	62	92	1.8	7	1.20	0.21	1.2		0.20	20
Pea Vine Silage	25	58	58	26	58	16		29	44	55	61	3.3	8	1.25	0.28	1.6		0.29	32
Pea Straw	89	50	50	12	49	7		42	49	72	98	1.3	7	0.60	0.15	1.1		0.15	
Peas Cull	89	86	95	63	89	25	22	7	9	15	0	1.5	4	0.15	0.45	1.1	0.06	0.26	30
Peanut Hulls	91	22	36	0	18	7		63	65	74	98	1.5	5	0.20	0.07	0.9			
Peanut Meal Solvent	91	77	82	53	79	50	27	8	15	27	23	3.6	6	0.24	0.58	1.0	0.03	0.30	38
Peanut Skins	92	0	0	0	0	17		13	20	28	0	22.0	3	0.19	0.20				
Pearl Millet Grain	87	82	89	59	85	13		2	6	18	34	4.5	3	0.03	0.36	0.5			
Pineapple Greenchop	17	45	45	3	44	8		23	35	64	41	2.6	7	0.28	0.08				
Pineapple Bran	89	71	74	46	73	5		19	31	66	20	1.5	3	0.26	0.12				
Pineapple Presscake	21	72	75	47	74	5		23	35	69	20	0.9	3	0.24	0.10				
Potato Vine Silage	15	59	59	28	59	15		26				3.7	19	2.10	0.29	4.0		0.37	
Potatoes Cull	21	80	86	56	83	10	0	2	3	4	0	0.4	5	0.03	0.24	2.2	0.30	0.09	
Potato Waste Wet	14	82	89	59	85	7	0	9	11	15	0	1.5	3	0.16	0.25	1.2	0.36	0.11	12
Potato Waste Dried	89	85	93	62	88	8	0	7	9	12	0	0.5	5	0.16	0.25	1.2	0.39	0.11	12
Potato Waste Wet with Lime	17	80	86	56	83	5	0	10	12	16	0	0.3	9	4.20	0.18				
Potato Waste Filter Cake	14	77	82	53	79	5	0	2				7.7	3	0.10	0.19	0.2			
Poultry By-product Meal	93	79	85	55	81	62	49	2				14.5	17	4.00	2.25	0.5	0.58	0.56	129
Poultry Manure Dried	89	38	40	0	36	28	22	13	15	35	0	2.1	33	10.20	2.80	2.3	1.05	0.20	520
Prairie Hay	91	50	50	12	49	7	37	34	47	67	98	2.0	8	0.40	0.15	1.1	0.06	0.06	34
Pumpkins, Cull	10	85	93	62	88	16		14	18	25	0	8.9	9	0.24	0.43	3.3			
Rice Straw	91	40	42	0	38	4		40	55	72	100	1.4	12	0.25	0.08	1.1		0.11	
Rice Straw Ammoniated	87	45	45	3	44	9		39	53	68	100	1.3	12	0.25	0.08	1.1		0.11	
Rice Grain	89	79	85	55	81	8	30	10	12	16	34	1.9	5	0.07	0.32	0.4	0.09	0.05	17
Rice Polishings	90	90	100	68	94	14		4	5			14.0	9	0.05	1.36	1.2	0.12	0.19	28
Rice Bran	91	72	75	47	74	14	30	13	18	23	0	19.0	11	0.07	1.70	1.8	0.09	0.19	40
Rice Hulls	92	13	35	0	8	3	45	44	70	81	90	0.9	20	0.14	0.07	0.5	0.08	0.08	24
Rice Mill By-product	91	42	43	0	40	7		32	48	60	0	5.7		0.40	0.31	2.2		0.30	31
Rye Grass Hay	90	58	58	26	58	10	30	33	38	65	98	3.3	8	0.45	0.30	2.2		0.18	27

		ENERGY				PROTEIN		FIBER											
FEEDSTUFF	DM	TDN	NE_M	NE_G	NE_L	CP	BYPASS	CF	ADF	NDF	eNDF	EE	ASH	CA	P	K	CL	S	ZN
	%	%	Mcal/cwt.			%	%	%	%	%	%	%	%	%	%	%	%	%	ppm
Rye Grass Silage	32	59	59	28	59	14	25	22	37	59	61	3.3	8	0.43	0.38	2.9	0.73	0.23	29
Rye Straw	89	44	44	1	43	4		44	55	71	100	1.5	6	0.24	0.09	1.0	0.24	0.11	
Rye Grain	89	82	89	59	85	12	20	2	9	19	34	1.7	2	0.07	0.39	0.5	0.03	0.17	33
Safflower Meal Solvent	91	55	55	21	55	24		33	41	57	36	1.2	6	0.35	0.78	1.0	0.21	0.23	65
Safflower Meal Dehulled Solvent	91	76	81	52	78	48		9				0.6	7	0.38	1.60	1.2	0.18	0.22	36
Sagebrush Fresh	50	50	50	12	49	13		25	28	36		9.2	10	1.00	0.25			0.22	
Sanfoin Hay	88	61	62	31	62	14	60	24				3.1	9						
Shrimp Waste Meal	90	48	48	9	47	50	60	11				5.5	25	8.50	1.75		1.15		
Sodium Tripolyphosphate	96	0	0	0	0	0		0	0	0	0	0.0	96	0.00	25.98	0.0		0.00	
Sorghum Stover	87	55	55	21	55	5		33	41	65	100	1.9	10	0.49	0.12	1.2			
Sorghum Silage	32	59	59	28	59	9	30	27	38	59	70	2.7	6	0.48	0.21	1.7	0.45	0.11	30
Sorghum Grain (Milo) Ground	89	82	89	59	85	11	55	3	6	16	5	3.1	2	0.04	0.32	0.4	0.10	0.14	18
Sorhum Grain (Milo) Flaked	82	90	100	68	94	11	62	3	6	20	38	3.1	2	0.04	0.28	0.4	0.10	0.14	18
Soybean Hay	89	52	52	16	51	15		35	40	55	92	2.2	8	1.29	0.30	1.1	0.15	0.24	24
Soybean Straw	88	42	43	0	40	5		44	54	70	100	1.4	6	1.59	0.06	0.6		0.26	
Soybeans Whole	88	93	104	71	97	40	28	9	11	15	100	18.8	5	0.27	0.64	2.0	0.03	0.34	56
Soybeans Whole, Extruded	88	93	104	71	97	40	35	9	11	15	100	18.8	5	0.27	0.64	2.0	0.03	0.34	56
Soybeans Whole, Roasted	88	93	104	71	97	40	48	9	11	15	100	18.8	5	0.27	0.64	2.0	0.03	0.34	56
Soybean Hulls	90	77	82	52	79	12	28	38	46	64	28	2.6	5	0.55	0.17	1.4	0.02	0.12	38
Soybean Meal Solvent 44% CP	91	84	92	61	87	49	35	6	10	15	23	1.6	7	0.38	0.71	2.3	0.07	0.43	62
Soybean Meal CP Solvent 49%	91	87	96	64	90	54	36	3	6	9	23	1.2	6	0.28	0.71	2.2	0.08	0.47	61
Soybean Mill Feed	90	51	51	14	50	15		36	46			2.0	6	0.49	0.18	1.7		0.07	
Spelt Grain	88	75	79	50	77	13	27	10	17	21	34	2.1	4	0.04	0.40	0.4		0.15	47
Sudangrass Fresh Immature	18	70	73	44	71	17		23	29	55	41	3.9	9	0.46	0.36	2.0		0.11	24
Sudangrass Hay	88	57	57	25	57	9	30	36	43	67	98	1.8	10	0.50	0.22	2.2	0.80	0.12	26
Sudangrass Silage	31	58	58	26	58	10	28	30	42	64	61	3.1	10	0.58	0.27	2.4	0.52	0.14	29
Sunflower Seed Meal Solvent	92	65	66	37	66	38	27	20	24	36	23	2.5	8	0.44	0.97	1.2	0.15	0.33	55
Sunflower Seed Meal with Hulls	91	57	57	25	57	31	35	27	32	44	37	2.4	7	0.40	1.03	1.0		0.30	85
Sunflower Seed Hulls	90	40	42	0	38	4	65	52	63	73	90	2.2	3	0.00	0.11	0.2		0.19	200
Sugar Cane Bagasse	91	36	39	0	34	1		49	59	86	100	0.7	3	0.90	0.29	0.5		0.10	
Tapioca Meal	89	83	90	60	86	2		5	8	34		0.8	3	0.03	0.05				
Timothy Fresh Pre-bloom	26	64	65	36	65	11	20	31	36	59	41	3.8	7	0.40	0.28	1.9	0.57	0.15	28
Timothy Hay Early Bloom	88	59	59	28	59	11	22	32	39	63	98	2.7	6	0.58	0.26	1.9	0.51	0.21	30
Timothy Hay Full Bloom	88	57	57	25	57	8	30	34	40	65	98	2.6	5	0.43	0.20	1.8	0.62	0.13	25
Timothy Silage	34	59	59	28	59	10	25	34	45	70	61	3.4	7	0.50	0.27	1.7		0.15	
Tomato Pomace Dried	92	64	65	36	65	23		26	50	55	34	10.6	6	0.43	0.59	3.6			
Triticale Hay	90	56	56	23	56	10		34	41	69	98			0.30	0.26	2.3			25
Triticale Silage	34	58	58	26	58	14		30	39	56	61	3.6		0.58	0.34	2.7		0.28	36
Triticale Grain	89	85	93	62	88	14	25	4	5	22	34	2.4	2	0.07	0.39	0.5		0.17	37
Turnip Tops (Purple)	18	69	71	43	70	16		10	13			2.6	13	3.20	0.31	3.0	1.80	0.27	
Turnip Roots	9	86	95	63	89	12	0	11	34	44	40	1.5	8	0.70	0.34	3.2	0.65	0.43	40
Urea 46% N	99	0	0	0	0	288	0	0	0	0	0	0.0	0	0.00	0.00	0.0	0.00	0.00	0
Vetch Hay	89	58	58	26	58	18	14	30	33	48	92	1.8	8	1.25	0.34	2.4		0.13	
Wheat Fresh, Pasture	21	71	74	46	73	20	16	18	30	50	41	4.0	13	0.35	0.36	3.1	0.67	0.22	
Wheat Hay	90	57	57	25	57	9	25	29	38	66	98	2.0	8	0.21	0.22	1.4	0.50	0.19	23
Wheat Silage	33	59	59	28	59	12	21	28	37	62	61	3.2	8	0.40	0.28	2.1	0.50	0.21	27
Wheat Straw	91	42	43	0	40	3	60	43	58	81	98	1.8	8	0.16	0.05	1.3	0.32	0.17	6
Wheat Straw Ammoniated	85	50	50	12	49	9	25	40	55	76	98	1.5	9	0.15	0.05	1.3	0.30	0.16	6
Wheat Grain	89	88	98	65	91	14	23	3	4	12	0	2.3	2	0.05	0.43	0.4	0.09	0.15	40
Wheat Grain Hard	89	88	98	65	91	14	28	3	6	14	0	2.0	2	0.05	0.43	0.5		0.16	45
Wheat Grain Soft	89	88	98	65	91	12	23	3	4	12	0	2.0	2	0.06	0.40	0.4		0.15	30
Wheat Grain, Steam Flaked	85	91	102	69	95	14	29	3	4	12	0	2.3	2	0.05	0.39	0.4		0.15	40
Wheat Grain Sprouted	86	88	98	65	91	12	18	3	4	13	0	2.0	2	0.04	0.36	0.4		0.17	45
Wheat Bran	89	70	73	44	71	17	28	11	13	46	4	4.5	7	0.13	1.29	1.4	0.05	0.24	96
Wheat Middlings	89	82	89	59	85	19	22	8	12	36	2	4.6	5	0.15	1.02	1.4	0.05	0.21	98
Wheat Mill Run	90	75	79	50	77	17	28	9	12	37	0	4.4	5	0.12	1.00	1.2	0.07	0.22	90
Wheat Shorts	89	80	86	56	83	20	25	7	7	30	0	5.4	5	0.10	0.95	1.1	0.08	0.20	118
Wheatgrass Crested Fresh Early Bloom	37	60	60	30	60	11	25	26	28	50	41	1.6	7	0.46	0.32	2.4			
Wheatgrass Crested Fresh Full Bloom	50	55	55	21	55	10	33	33	36	65	41	1.6	7	0.39	0.28	2.1			
Wheatgrass Crested Hay	92	54	54	20	54	10	33	33	36	65	98	2.4	7	0.33	0.20	2.0			32
Whey Dried	94	82	89	59	85	14	15	0	0	0	0	1.0	9	1.00	0.90	1.4	1.20	0.92	10