

# AGRICULTURAL GUIDE

Published by the University of Missouri-Columbia Extension Division

JAN 07 1986

Beef feeding

## Feed Composition Tables

Homer B. Sewell

Department of Animal Science, College of Agriculture

These tables are adapted from Nutrient Requirements of Beef Cattle, Sixth Revised Edition, National Research Council, 1984.

Refer to UMC Guide 2067, "Nutrient requirements for growing and finishing beef cattle," for additional NRC tables.

**Table 1 Composition of Feeds Commonly Used in Beef Cattle Ration (As Fed Basis)  
Use with NRC Table 1 in UMC Guide 2067**

	Dry Mater %	Crude Protein %	NE <sub>m</sub> Mcal/lb	NE <sub>g</sub> Mcal/lb	TDN %	Fat %	Crude Fiber %	Calcium %	Phosphorus %	Potassium %	Sodium %	Sulfur %
<b>Concentrates</b>												
Barley	88.0	11.9	0.83	0.56	74	1.8	5.0	0.04	0.33	0.41	0.03	0.15
Brewers Grains, Dried	92.0	27.1	0.63	0.38	61	6.6	13.2	0.30	0.51	0.08	0.21	0.29
Corn												
Corn & Cob Meal	87.0	7.8	0.80	0.54	72	3.2	8.2	0.06	0.23	0.46	0.02	0.14
Yellow Dent #2	88.0	8.9	0.90	0.62	79	3.7	1.9	0.02	0.31	0.33	0.02	0.12
Corn Gluten Feed	90.0	23.0	0.83	0.56	75	2.2	8.7	--	0.74	0.58	0.95	0.21
Distillers Grain Corn	94.0	22.0	0.90	0.49	81	9.2	11.4	0.10	0.40	0.17	0.09	0.43
Molasses												
Beet	78.0	6.6	0.68	0.45	62	0.2	0.0	0.13	0.02	4.73	1.15	0.47
Cane	75.0	4.4	0.58	0.37	54	0.1	0.04	0.75	0.08	2.88	0.17	0.35
Cane, Dried	94.0	9.7	0.70	0.44	66	0.8	6.3	1.03	0.14	3.38	0.19	0.43
Oats	89.0	11.8	0.75	0.49	69	4.8	10.8	0.06	0.34	0.39	0.07	0.20
Sorghum												
Grain (8-10% Protein)	87.0	8.8	0.81	0.55	73	3.0	2.3	0.03	0.31	0.33	0.01	0.11
Grain (10%+ Protein)	88.0	11.0	0.81	0.55	73	2.1	2.3	0.04	0.32	0.33	0.01	0.11
Wheat												
Bran	89.0	15.2	0.66	0.42	62	3.9	10.1	0.12	1.23	1.39	0.04	0.22
Hard Winter	88.0	12.7	0.87	0.60	77	1.6	2.5	0.04	0.38	0.43	0.02	0.13
Soft Winter	88.0	11.4	0.88	0.61	78	1.6	2.1	0.04	0.38	0.40	0.01	0.11
<b>Protein Supplements</b>												
Corn												
Distillers Grain with solubles corn	92.0	23.0	0.91	0.63	81	9.5	9.1	0.14	0.65	0.40	0.52	0.30
Cotton seed, seeds	92.0	22.0	1.01	0.71	88	21.3	19.1	0.15	0.69	1.11	0.29	0.24
Cotton seed meal												
Expeller	93.0	41.2	0.80	0.52	73	4.7	11.9	0.20	1.08	1.35	0.05	0.40
Solvent	91.0	41.1	0.76	0.49	69	1.5	12.1	0.16	1.10	1.38	0.05	0.25
Linseed meal, solvent	90.0	34.5	0.77	0.50	70	1.4	9.1	0.39	0.80	1.38	0.14	0.39
Soybean												
Whole seed	92.0	39.4	0.95	0.65	84	17.3	5.3	0.25	0.60	1.67	0.02	0.22
Meal, dehulled	90.0	49.6	0.88	0.60	78	0.9	3.3	0.26	0.63	2.07	0.03	0.43
Meal, solvent	89.0	44.4	0.84	0.60	75	1.3	6.2	0.29	0.63	1.90	0.03	0.42
Urea (45% N)			281.0									
Urea (42% N)			262.0									

**Table 1 (Continued)**

	Dry Matter %	Crude Protein %	NE <sub>m</sub> Mcal/lb	NE <sub>e</sub> Mcal/lb	TDN %	Fat %	Crude Fiber %	Calcium %	Phosphorus %	Potassium %	Sodium %	Sulfur %
<u>Dry Roughages</u>												
Alfalfa												
Hay, early bloom	90.0	16.2	0.54	0.31	54	2.7	20.7	1.27	0.20	2.27	0.13	0.25
Hay, mid bloom	90.0	15.3	0.50	0.28	52	2.3	23.4	1.27	0.22	1.54	0.11	0.25
Hay, mature	91.0	11.7	0.40	0.17	46	1.2	34.3	1.03	0.16	1.62	0.07	0.23
Meal, dehydrated	92.0	17.4	0.56	0.32	56	2.8	24.1	1.40	0.23	2.39	0.10	0.22
Brome, smooth hay												
Mid bloom	90.0	13.1	0.49	0.25	50	9.0	28.6	0.26	0.25	1.79	0.01	--
Mature	90.1	6.0	0.47	0.14	47	1.8	32.6	0.27	0.20	1.13	--	--
Clover hay, red	89.0	14.2	0.46	0.23	49	2.5	25.6	1.36	0.22	1.44	0.17	0.15
Corn cobs, ground	90.0	2.9	0.40	0.17	45	0.6	32.6	0.11	0.04	0.78	0.42	0.42
Corn stover	85.0	5.6	0.37	0.16	43	1.1	29.2	0.48	0.09	1.23	0.06	0.14
Cotton seed hulls	91.0	3.7	0.28	0.06	38	1.5	43.5	0.14	0.08	0.79	0.02	0.08
Fescue hay												
Early bloom	92.0	8.7	0.38	0.15	44	1.8	34.0	0.28	0.24	1.56	0.15	--
Mature	90.0	7.6	0.47	0.14	47	1.8	30.5	0.34	0.21	1.98	0.14	--
Grain sorghum Stover	88.0	4.6	0.44	0.22	48	1.5	29.5	0.46	0.11	1.06	0.02	--
Lespedeza hay												
Early bloom	93.0	14.4	0.48	0.24	51	3.9	26.0	1.14	0.23	0.93	--	--
Full bloom	93.0	12.5	0.36	0.14	44	2.9	29.8	0.97	0.21	0.93	--	--
Orchard grass hay												
Early bloom	89.0	13.4	0.60	0.36	58	2.5	27.6	0.24	0.30	2.59	0.01	0.19
Mature	90.4	7.1	0.47	0.14	47	2.4	35.1	0.24	0.27	2.41	0.01	--
Soybean hulls	91.0	11.0	0.59	0.35	58	1.9	36.5	0.45	0.19	1.16	0.01	0.08
Soybean straw	88.0	4.6	0.27	0.06	37	1.3	39.0	1.40	0.05	0.49	0.11	0.23
Sudan grass hay	91.0	16.4	0.49	0.25	51	1.0	32.8	0.50	0.27	1.70	0.02	0.05
Timothy hay												
Early bloom	90.0	13.5	0.52	0.29	53	2.6	25.2	0.48	0.23	1.43	0.16	--
Full bloom	89.0	7.2	0.48	0.25	50	2.8	28.5	0.38	0.18	1.46	0.16	--
Wheat straw	89.0	3.2	0.26	0.04	36	1.6	37.0	0.16	0.04	1.26	0.12	0.17
<u>Fresh Forage</u>												
Alfalfa												
Early bloom	23.0	4.4	0.14	0.08	14	0.7	5.8	0.54	0.07	0.44	0.05	0.09
Brome												
Early vegetative	30.0	6.4	0.24	0.15	22	1.3	6.8	0.17	0.14	0.95	--	--
Mature	55.0	3.3	0.27	0.13	29	1.3	19.1	0.14	0.09	0.69	--	--
Fescue tall												
April-May	20.9	3.9	0.13	0.08	13	0.7	5.5	0.08	0.07	0.71	0.03	--
July-Aug	35.3	3.0	0.18	0.05	17	0.7	12.0	0.13	0.08	0.79	--	--
Sept-Nov	34.0	3.4	0.19	0.09	20	0.7	11.2	0.13	0.07	0.54	--	--
Dec-March	60.0	4.2	0.30	0.08	29	1.0	19.4	0.25	0.11	0.30	--	--
Lespedeza												
Early bloom	28.0	4.6	0.15	0.07	15	0.6	9.0	0.38	0.06	0.31	--	--
Mature	35.5	4.5	0.17	0.04	15	0.7	15.9	0.36	0.11	0.27	--	--
Orchard grass												
Early vegetative	23.0	4.2	0.18	0.11	17	1.1	5.6	0.13	0.12	0.82	0.01	0.05
Full bloom	29.9	2.5	0.18	0.09	18	1.0	9.9	0.07	0.07	--	--	--
Timothy												
Late vegetative	26.0	4.7	0.20	0.13	19	1.0	5.8	0.10	0.08	0.62	0.05	0.03
Mature	35.8	2.2	0.19	0.08	19	1.0	12.0	0.06	0.06	0.56	0.02	0.05
<u>Silages</u>												
Alfalfa												
Early bloom wilted	35.0	6.0	0.21	0.12	21	1.1	9.8	0.49	0.08	0.88	0.05	0.10
Full bloom wilted	45.0	6.3	0.23	0.12	25	1.2	15.8	0.80	0.08	0.80	0.04	0.11

**Table 1 (Continued)**

	Dry Matter %	Crude Protein %	NE <sub>m</sub> Mcal/lb	NE <sub>g</sub> Mcal/lb	TDN %	Fat %	Crude Fiber %	Calcium %	Phosphorus %	Potassium %	Sodium %	Sulfur %
<b>Corn</b>												
Dent, well-eared	33.0	2.7	0.24	0.16	23	1.0	7.9	0.08	0.07	0.32	0.00	0.05
Dent, few ears	29.0	2.4	0.18	0.10	20	0.9	9.4	0.10	0.06	0.41	--	0.02
Oat, dough	35.0	3.5	0.19	0.10	20	1.4	11.5	0.16	0.12	--	--	--
<b>Sorghum</b>												
Grain	30.0	2.3	0.18	0.10	18	0.9	8.4	0.11	0.06	0.41	0.01	0.03
Sorgo	27.0	1.7	0.15	0.08	16	0.7	7.6	0.09	0.05	0.30	0.04	0.03
Sorghum, Sudan	28.0	3.0	0.15	0.07	15	0.8	9.3	0.13	0.06	0.63	0.01	0.02
<b>Wheat</b>												
dough	35.0	2.5	0.21	0.11	21	1.1	10.5	0.05	0.08	0.70	0.01	0.08
Wheat, full bloom	25.0	2.0	0.15	0.08	15	0.8	7.7	--	--	--	--	--
<b>Mineral Supplements</b>												
Bonemeal, steamed	97.0	8.1						30.58	13.79	0.18	0.39	0.20
Calcium Sulfate (Gypsum)	85.0							22.02				20.01
Dicalcium phosphate	97.0							21.34	18.72	0.07	0.05	1.11
Limestone	100.0							39.39	0.04	0.06	0.06	--
Monosodium phosphate	97.0							21.83	--		16.18	--
Phosphate, defluorinated	100.0							32.00	18.00	0.08	4.90	
Sodium Tripolyphosphate	96.0								24.94		29.76	

**Table 2 Composition of Feeds Commonly Used in Beef Cattle Rations  
Use with NRC Table 2 in UMC Guide 2067**

	On a Dry Basis (Moisture Free)											
	Dry Matter %	Crude Protein %	NE <sub>m</sub> Mcal/lb	NE <sub>g</sub> Mcal/lb	TDN %	Fat %	Crude Fiber %	Calcium %	Phosphorus %	Potassium %	Sodium %	Sulfur %
<b>Concentrates</b>												
Barley	88.0	13.5	0.94	0.64	84	2.1	5.7	0.05	0.38	0.47	0.03	0.17
Brewers Grains, Dried	92.0	29.4	0.69	0.41	66	7.2	14.4	0.33	0.55	0.09	0.23	0.32
<b>Corn</b>												
Corn & Cob Meal	87.0	9.0	0.92	0.62	83	3.7	9.4	0.07	0.27	0.53	0.02	0.16
Yellow Dent #2	88.0	10.1	1.02	0.70	90	4.2	2.2	0.02	0.35	0.37	0.02	0.14
Corn Gluten Feed	90.0	25.6	0.92	0.62	83	2.4	9.7	--	0.82	0.64	1.05	0.23
Distillers Grain Corn	94.0	23.0	0.96	0.52	86	9.8	12.1	0.11	0.43	0.18	0.10	0.46
<b>Molasses</b>												
Beet	78.0	8.5	0.87	0.58	79	0.2	0.0	0.17	0.03	6.07	1.48	0.60
Cane	75.0	5.8	0.77	0.49	72	0.1	0.05	1.00	0.11	3.84	0.22	0.47
Cane, Dried	94.0	10.3	0.74	0.47	70	0.9	6.7	1.10	0.15	3.60	0.20	0.46
Oats	89.0	13.3	0.84	0.55	77	5.4	12.1	0.07	0.38	0.44	0.08	0.23
<b>Sorghum</b>												
Grain (8-10% Protein)	87.0	10.1	0.93	0.63	84	3.4	2.6	0.04	0.36	0.38	0.01	0.13
Grain (10%+ Protein)	88.0	12.5	0.92	0.62	83	2.4	2.6	0.04	0.36	0.38	0.01	0.13
<b>Wheat</b>												
Bran	89.0	17.1	0.74	0.47	70	4.4	11.3	0.13	1.38	1.56	0.04	0.25
Hard Winter	88.0	14.4	0.99	0.68	88	1.8	2.8	0.05	0.43	0.49	0.02	0.15
Soft Winter	88.0	13.0	1.00	0.69	89	1.8	2.4	0.05	0.43	0.46	0.01	0.12
<b>Protein Supplements</b>												
Corn												
Distillers Grain with solubles corn	92.0	25.0	0.99	0.68	88	10.3	9.9	0.15	0.71	0.44	0.57	0.33

**Table 2 (Continued)**

	On a Dry Basis (Moisture Free)											
	Matter %	Dry Protein %	Crude Mcal/lb	NE <sub>m</sub> Mcal/lb	NE <sub>e</sub> TDN %	Fat %	Fiber %	Crude Calcium %	phorus %	Phos-sium %	Potas-Sodium %	Sulfur %
Cotton seed, seeds	92.0	23.9	1.10	0.77	96	23.1	20.8	0.16	0.75	1.21	0.31	0.26
Cotton seed meal												
Expeller	93.0	44.3	0.86	0.56	78	5.0	12.8	0.21	1.16	1.45	0.05	0.43
Solvent	91.0	45.2	0.83	0.54	76	1.6	13.3	0.18	1.21	1.52	0.05	0.28
Linseed meal, solvent	90.0	38.3	0.86	0.56	78	1.5	10.1	0.43	0.89	1.53	0.15	0.43
Soybean												
Whole seed	92.0	42.8	1.03	0.71	91	18.8	5.8	0.27	0.65	1.82	0.02	0.24
Meal, dehulled	90.0	55.1	0.98	0.67	87	1.0	3.7	0.29	0.70	2.30	0.03	0.48
Meal, solvent	89.0	49.9	0.94	0.64	84	1.5	7.0	0.33	0.71	2.14	0.03	0.47
Urea (45% N)		281.0										
Urea (42% N)		262.0										
<u>Dry Roughages</u>												
Alfalfa												
Hay, early bloom	90.0	18.0	0.60	0.34	60	3.0	23.0	1.41	0.22	2.52	0.14	0.28
Hay, mid bloom	90.0	17.0	0.56	0.31	58	2.6	26.0	1.41	0.24	1.71	0.12	0.28
Hay, mature	91.0	12.9	0.44	0.19	50	1.3	37.7	1.13	0.18	1.78	0.08	0.25
Meal, dehydrated	92.0	18.9	0.61	0.35	61	3.0	26.2	1.52	0.25	2.60	0.11	0.24
Brome, smooth hay												
Mid bloom	90.0	14.6	0.54	0.28	56	2.6	31.8	0.29	0.28	1.99	0.01	--
Mature	90.1	6.7	0.52	0.16	52	2.0	36.2	0.30	0.22	1.25	--	--
Clover hay, red	89.0	16.0	0.52	0.26	55	2.8	28.8	1.53	0.25	1.62	0.19	0.17
Corn cobs, ground	90.0	3.2	0.44	0.19	50	0.7	36.2	0.12	0.04	0.87	0.47	0.47
Corn stover	85.0	6.6	0.44	0.19	50	1.3	34.4	0.57	0.10	1.45	0.07	0.17
Cotton seed hulls	91.0	4.1	0.31	0.07	42	1.7	47.8	0.15	0.09	0.87	0.02	0.09
Fescue hay												
Early bloom	92.0	9.5	0.41	0.16	48	2.0	37.0	0.30	0.26	1.70	0.16	--
Mature	90.0	8.4	0.52	0.16	52	2.0	33.9	0.38	0.23	2.20	0.15	--
Grain sorghum												
Stover	88.0	5.2	0.50	0.25	54	1.7	33.5	0.52	0.13	1.20	0.02	--
Lespedeza hay												
Early bloom	93.0	15.5	0.52	0.26	55	4.2	28.0	1.23	0.25	1.00	--	--
Full bloom	93.0	13.4	0.39	0.15	47	3.1	32.0	1.04	0.23	1.00	--	--
Orchard grass hay												
Early bloom	89.0	15.0	0.67	0.40	65	2.8	31.0	0.27	0.34	2.91	0.01	0.21
Mature	90.4	7.9	0.52	0.16	52	2.7	38.8	0.26	0.30	2.67	0.01	--
Soybean hulls	91.0	12.1	0.65	0.39	64	2.1	40.1	0.49	0.21	1.27	0.01	0.09
Soybean straw	88.0	5.2	0.31	0.07	42	1.5	44.3	1.59	0.06	0.56	0.12	0.26
Sudan grass hay	91.0	18.0	0.54	0.28	56	1.0	36.0	0.55	0.30	1.87	0.02	0.06
Timothy hay												
Early bloom	90.0	15.0	0.58	0.32	59	2.9	28.0	0.53	0.25	1.59	0.18	--
Full bloom	89.0	8.1	0.54	0.28	56	3.1	32.0	0.43	0.20	1.64	0.18	--
Wheat straw	89.0	3.6	0.29	0.05	41	1.8	41.6	0.18	0.05	1.42	0.14	0.19
<u>Fresh Forage</u>												
Alfalfa												
Early bloom	23.0	19.0	0.60	0.34	60	3.1	25.0	2.33	0.31	1.92	0.20	0.39
Brome												
Early vegetative	30.0	21.3	0.79	0.50	73	4.2	22.8	0.55	0.45	3.16	--	--
Mature	55.0	6.0	0.49	0.24	53	2.4	34.8	0.26	0.16	1.25	--	--

**Table 2 (Continued)**

On a Dry Basis (Moisture Free)

	Matter %	Dry Protein %	Crude Mcal/lb	NE <sub>m</sub> Mcal/lb	NE <sub>g</sub> TDN %	Fat %	Fiber %	Crude Calcium %	phorus %	Phos-sium %	Potas-Sodium %	Sulfur %
<b>Fescue tall</b>												
April-May	20.9	18.5	0.64	0.37	63	3.4	26.2	0.40	0.34	3.41	0.16	--
July-Aug	35.3	8.6	0.50	0.14	48	2.1	33.9	0.38	0.23	2.24	--	--
Sept-Nov	34.0	10.0	0.56	0.26	58	2.2	32.8	0.39	0.20	1.59	--	--
Dec-March	60.0	7.0	0.50	0.14	48	1.7	32.4	0.42	0.19	0.50	--	--
<b>Lespedeza</b>												
Early bloom	28.0	16.4	0.52	0.26	55	2.0	32.0	1.35	0.21	1.12	--	--
Mature	35.5	12.8	0.48	0.11	43	2.1	44.9	1.02	0.31	0.77	--	--
<b>Orchard grass</b>												
Early vegetative	23.0	18.4	0.77	0.49	72	4.9	24.3	0.58	0.54	3.58	0.04	0.21
Full bloom	29.9	8.5	0.59	0.30	60	3.3	33.1	0.23	0.22	-	--	--
<b>Timothy</b>												
Late vegetative	26.0	18.0	0.77	0.49	72	3.8	22.3	0.39	0.32	2.40	0.19	0.13
Mature	35.8	6.1	0.53	0.22	54	2.9	33.4	0.16	0.18	1.57	0.06	0.13
<b>Silages</b>												
<b>Alfalfa</b>												
Early bloom wilted	35.0	17.0	0.60	0.34	60	3.2	28.0	1.40	0.22	2.52	0.14	0.28
Full bloom wilted	45.0	14.0	0.52	0.26	55	2.7	35.2	1.78	0.18	1.78	0.08	0.25
<b>Corn</b>												
Dent, well-eared	33.0	8.1	0.74	0.47	70	3.1	23.9	0.23	0.22	0.96	0.01	0.15
Dent, few ears	29.0	8.4	0.63	0.36	68	3.0	32.3	0.34	0.19	1.41	--	0.08
<b>Oat, dough</b>	35.0	10.0	0.55	0.29	57	4.1	33.0	0.47	0.33	--	--	--
<b>Sorghum</b>												
Grain	30.0	7.5	0.60	0.34	60	3.0	27.9	0.35	0.21	1.37	0.02	0.11
Sorgo	27.0	6.2	0.56	0.31	58	2.6	28.3	0.34	0.17	1.12	0.15	0.10
<b>Sorghum, Sudan</b>	28.0	10.8	0.52	0.26	55	2.8	33.1	0.46	0.21	2.25	0.02	0.06
<b>Wheat, dough</b>	35.0	7.0	0.59	0.30	60	3.1	30.0	0.14	0.22	2.00	0.02	0.23
Wheat, full bloom	25.0	8.1	0.58	0.32	59	3.0	30.9	--	--	--	--	--
<b>Mineral Supplements</b>												
Bonemeal, steamed	97.0	8.4						31.53	14.22	0.19	0.40	0.21
Calcium Sulfate (Gypsum)	85.0							25.90				23.54
Dicalcium phosphate	97.0							22.00	19.30	0.07	0.05	1.14
Limestone	100.0							39.39	0.04	0.06	0.06	--
Monosodium phosphate	97.0							22.50	--	16.68	--	
Phosphate, defluo- rinated	100.0							32.00	18.00	0.08	4.90	
Sodium Tripoly- phosphate	96.0							25.98		31.00		

■ Issued in furtherance of Cooperative Extension Work Acts of May 8 and June 30, 1914 in cooperation with the United States Department of Agriculture. John W. Oren, Director, Cooperative Extension Service, University of Missouri and Lincoln University, Columbia, Missouri 65211. ■ An equal opportunity institution.

2051

Revised 10/85/8M