

Table 1. Proximate analysis of Distiller's Dried Grains with Solubles (DDGS).¹

Sample origin	# of samples	DM (%)	CP (%)	Fat (%)	AH Fat (%)	Fiber (%)	Ash (%)	NFE (%)	Carbo-hydrates (%)	ADF (%)	TDN (%)	Swine DE ² (kcal/kg)	Swine ME ² (kcal/kg)	Swine NE ³ (kcal/kg)	Starch (%)	Salt (%)
ILLINOIS																
Adkins Energy, LLC, Lena	1	88.2	24.6	9.2	ND	7.16	5.48	41.8	48.9	9.6	75.2	3,940	3,748	2,429	4.8	0.25
Patriot Renewable Fuels, LLC, Annawan	1	88.1	25.6	10.5	ND	6.55	3.90	41.6	48.1	10.5	77.6	4,243	4,028	2,583	5.1	0.23
INDIANA																
Cardinal Ethanol, LLC, Union City	1	90.0	24.6	9.9	ND	7.01	3.83	44.8	51.8	9.8	78.6	4,175	3,972	2,561	7.5	0.28
Iroquois Bio-Energy Co, LLC, Rensselaer	1	87.5	27.3	8.6	ND	7.35	3.90	40.4	47.7	11.5	75.1	4,158	3,932	2,511	5.7	0.28
IOWA																
Absolute Energy, LLC, St Asgar	1	89.6	25.5	10.7	ND	7.23	4.38	41.8	49.1	8.8	78.9	4,147	3,938	2,556	3.5	0.32
Homeland Energy Solutions, LLC, Lawler	1	91.2	25.6	10.9	ND	7.31	4.10	43.4	50.7	11.1	80.2	4,184	3,972	2,541	4.9	0.29
MICHIGAN																
Carbon Green Energy, LLC, Lake Odessa	1	89.8	26.0	8.4	ND	7.54	4.67	43.2	50.8	10.8	76.2	4,016	3,808	2,448	3.9	0.25
MINNESOTA																
Granite Falls Energy, LLC, Granite Falls	1	88.8	27.0	8.6	ND	6.91	4.28	42.1	49.0	10.3	76.0	4,132	3,911	2,515	4.0	0.37
Highwater Ethanol, LLC, Lambertton	1	88.3	26.3	11.1	ND	6.87	3.93	40.2	47.0	11.6	78.2	4,257	4,035	2,571	3.3	0.32
NEW YORK																
Western New York Energy, LLC, Medina	1	87.5	26.0	9.1	ND	7.71	4.65	40.1	47.8	10.8	75.1	4,034	3,826	2,458	3.4	0.26
SOUTH DAKOTA																
Glacial Lakes Energy, LLC, Mina	1	91.0	28.0	11.2	ND	6.47	4.30	41.1	47.5	10.1	80.4	4,281	4,042	2,598	4.8	0.23
Glacial Lakes Energy, LLC, Watertown	1	90.0	26.2	10.0	ND	6.76	3.71	43.3	50.0	10.4	78.8	4,249	4,028	2,584	5.8	0.23
Redfield Energy, LLC, Redfield	1	88.8	24.8	9.4	ND	7.61	4.10	43.0	50.6	10.5	76.8	4,090	3,889	2,501	5.5	0.25
TOTAL # of samples	13															
AVERAGE		89.15	25.96	9.80	#DIV/0!	7.11	4.25	42.04	49.15	10.44	77.45	4146.69	3933.01	2527.29	4.78	0.27

¹ Nutrient values expressed on 100% dry matter basis.² DE = 4,151 – (122 x % Ash) + (23 x %CP) + (38 x %Fat) – (64 x %Crude Fiber); ME = DE x [1.003 - (0.0021 x %CP)], Noblet and Perez (1993).³ NE = 328 + (0.599 x ME) – (15 x %Ash) – (30 x %ADF), Ewan (1989).⁴ ND = not determined.

Table 2. Mineral composition of Distiller's Dried Grains with Solubles (DDGS).¹

Sample origin	# of samples	Calcium (ppm)	Phosphorus (%)	Potassium (%)	Magnesium (%)	Sulfur (%)	Sodium (%)	Chloride (%)	Zinc (ppm)	Manganese (ppm)	Copper (ppm)	Iron (ppm)
ILLINOIS												
Adkins Energy, LLC, Lena	1	6447	0.88	1.04	0.37	0.59	0.17	ND	55.8	12.9	4.71	83.3
Patriot Renewable Fuels, LLC, Annawan	1	280	0.83	0.99	0.31	0.51	0.15	ND	57.7	12.8	4.00	65.7
INDIANA												
Cardinal Ethanol, LLC, Union City	1	224	0.83	0.96	0.30	0.71	0.14	ND	63.9	13.0	5.16	69.8
Iroquois Bio-Energy Co, LLC, Rensselaer	1	314	0.80	0.95	0.32	0.63	0.16	ND	61.1	12.6	5.44	77.0
IOWA												
Absolute Energy, LLC, St Asgar	1	266	0.82	1.08	0.32	0.57	0.24	ND	54.7	12.4	4.47	70.6
Homeland Energy Solutions, LLC, Lawler	1	253	0.83	1.03	0.30	0.66	0.11	ND	54.2	12.5	4.66	76.3
MICHIGAN												
Carbon Green Energy, LLC, Lake Odessa	1	258	0.87	1.07	0.33	0.92	0.29	ND	61.8	14.2	4.22	74.3
MINNESOTA												
Granite Falls Energy, LLC, Granite Falls	1	230	0.83	1.08	0.34	0.61	0.18	ND	74.4	12.9	4.96	70.0
Highwater Ethanol, LLC, Lamberton	1	211	0.71	0.97	0.30	0.53	0.15	ND	45.2	10.9	4.47	69.3
NEW YORK												
Western New York Energy, LLC, Medina	1	198	0.98	1.16	0.34	0.56	0.21	ND	65.3	15.2	5.89	84.2
SOUTH DAKOTA												
Glacial Lakes Energy, LLC, Mina	1	292	0.84	1.13	0.35	0.35	0.19	ND	56.4	18.6	4.21	84.6
Glacial Lakes Energy, LLC, Watertown	1	218	0.72	0.97	0.30	0.33	0.09	ND	50.9	14.8	3.95	71.6
Redfield Energy, LLC, Redfield	1	187	0.78	1.05	0.32	0.50	0.14	ND	52.5	15.7	3.75	71.9
TOTAL # of samples	13											
AVERAGE		721.42	0.82	1.04	0.32	0.57	0.17	#DIV/0!	57.99	13.73	4.61	74.50

¹ Nutrient values expressed on 100% dry matter basis.

² ND = not determined.

Table 3. Essential amino acid level of Distiller's Dried Grains with Solubles (DDGS).¹

Sample origin	# of samples	Arginine (%)	Histidine (%)	Isoleucine (%)	Leucine (%)	Lysine (%)	Methionine (%)	Cystine (%)	Phenylalanine (%)	Threonine (%)	Tryptophan (%)	Valine (%)	Hydroxyproline (%)	Aspartic Acid (%)	Serine (%)	Glutamic Acid (%)	Proline (%)	Lanthionine (%)	Glycine (%)	Alanine (%)	Tyrosine (%)	Hydroxylysine (%)	Ornithine (%)
ILLINOIS																							
Adkins Energy, LLC, Lena	1	1.17	0.69	1.07	2.98	0.91	0.47	0.46	1.13	0.96	0.22	1.36	0.00	1.61	1.06	3.24	1.72	0.00	1.03	1.71	0.92	0.00	0.03
Patriot Renewable Fuels, LLC, Annawan	1	1.30	0.70	1.03	3.10	0.96	0.49	0.49	1.15	1.09	0.22	1.34	0.00	1.67	1.25	3.01	1.82	0.00	1.06	1.77	1.07	0.00	0.05
INDIANA																							
Cardinal Ethanol, LLC, Union City	1	1.22	0.69	1.06	3.03	0.90	0.48	0.49	1.16	0.98	0.21	1.34	0.00	1.61	1.12	3.14	1.80	0.00	1.04	1.72	0.96	0.00	0.03
Iroquois Bio-Energy Co, LLC, Rensselaer	1	1.46	0.83	1.25	3.62	1.09	0.59	0.58	1.38	1.16	0.23	1.61	0.00	1.94	1.30	3.99	2.21	0.00	1.24	2.10	1.14	0.00	0.04
IOWA																							
Absolute Energy, LLC, St Asgar	1	1.16	0.67	1.07	2.96	0.93	0.44	0.41	1.13	0.97	0.21	1.36	0.00	1.63	1.07	3.09	1.66	0.00	1.00	1.70	0.91	0.00	0.03
Homeland Energy Solutions, LLC, Lawler	1	1.18	0.65	1.02	3.01	0.87	0.45	0.42	1.11	0.99	0.21	1.31	0.00	1.55	1.14	2.93	1.74	0.00	0.95	1.67	0.97	0.00	0.04
MICHIGAN																							
Carbon Green Energy, LLC, Lake Odessa	1	1.21	0.76	1.16	3.31	0.96	0.52	0.53	1.31	1.00	0.20	1.48	0.00	1.72	1.05	3.59	1.94	0.00	1.09	1.88	0.98	0.00	0.03
MINNESOTA																							
Granite Falls Energy, LLC, Granite Falls	1	1.24	0.74	1.12	3.20	1.11	0.52	0.50	1.31	1.05	0.22	1.40	0.00	1.84	1.31	4.37	1.97	0.00	1.10	1.94	1.01	0.00	0.02
Highwater Ethanol, LLC, Lamberton	1	1.29	0.73	1.12	3.30	0.97	0.48	0.47	1.23	1.09	0.21	1.43	0.00	1.75	1.24	3.40	1.88	0.00	1.07	1.86	1.06	0.00	0.04
NEW YORK																							
Western New York Energy, LLC, Medina	1	1.26	0.75	1.14	3.24	0.98	0.53	0.51	1.22	1.06	0.22	1.47	0.00	1.72	1.16	3.41	1.89	0.00	1.11	1.86	1.04	0.00	0.04
SOUTH DAKOTA																							
Glacial Lakes Energy, LLC, Mina	1	1.24	0.75	1.21	3.42	0.90	0.55	0.52	1.28	1.07	0.22	1.53	0.00	1.80	1.18	3.58	2.11	0.00	1.13	1.91	1.05	0.00	0.04
Glacial Lakes Energy, LLC, Watertown	1	1.13	0.67	1.09	3.13	0.78	0.48	0.47	1.17	1.04	0.23	1.37	0.00	1.65	1.17	3.17	1.86	0.00	1.03	1.76	1.00	0.00	0.04
Redfield Energy, LLC, Redfield	1	1.17	0.67	1.03	2.89	0.93	0.49	0.47	1.09	0.96	0.21	1.33	0.00	1.56	1.06	2.96	1.69	0.00	0.99	1.65	0.93	0.00	0.03
TOTAL # of samples	13																						
AVERAGE		1.23	0.72	1.11	3.17	0.95	0.50	0.49	1.21	1.03	0.22	1.41	0.00	1.70	1.16	3.38	1.87	0.00	1.06	1.81	1.00	0.00	0.04

¹ Nutrient values expressed on 100% dry matter basis.² ND = not determined.