

Distillers Grains

...the “feed” part of ethanol production



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Disclaimer:

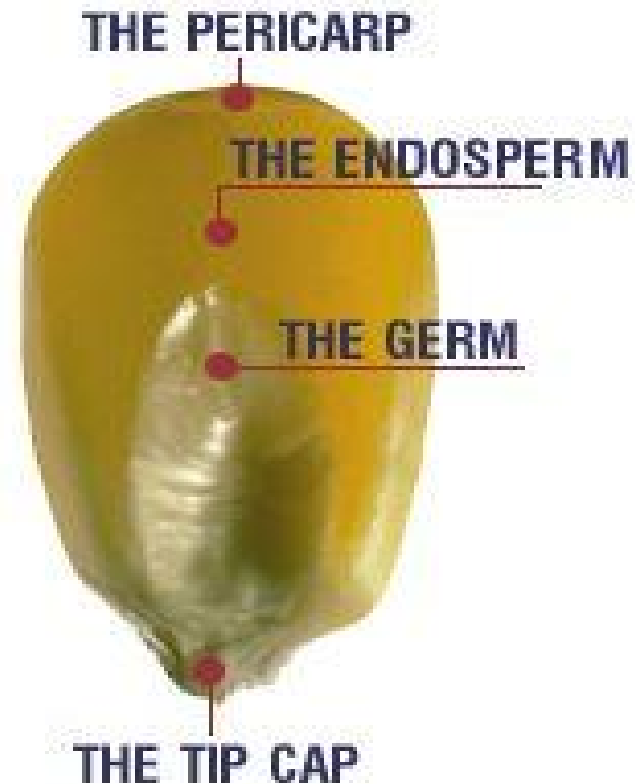
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First, the basics:

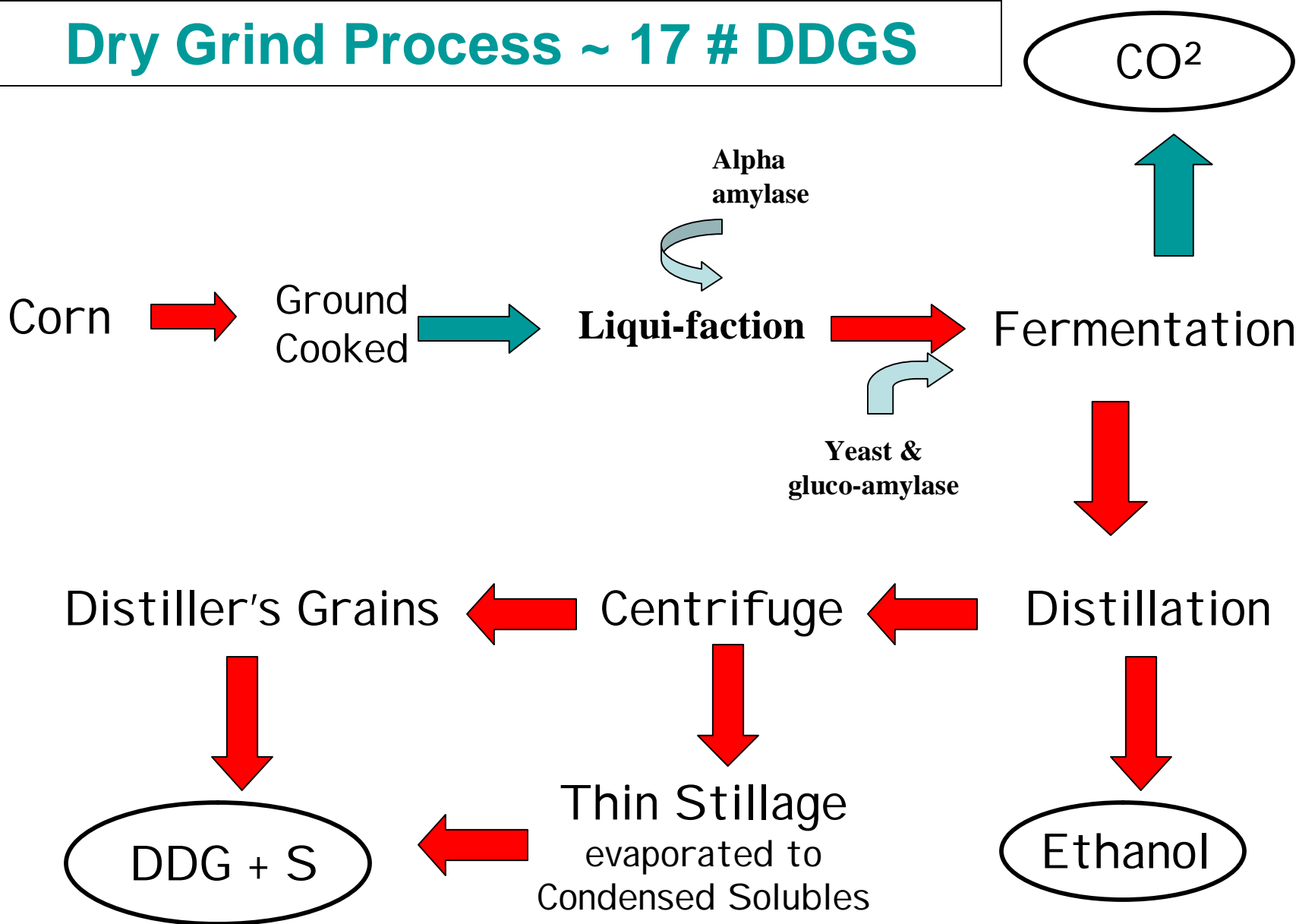
The starch in the corn kernel is the “solar energy sink” converted to ethanol

On a dry basis:

Starch	72.6 %
Corn Oil	4.3 %
Protein	9.8 %
NDF	9.0 %
Minerals	1.6 %



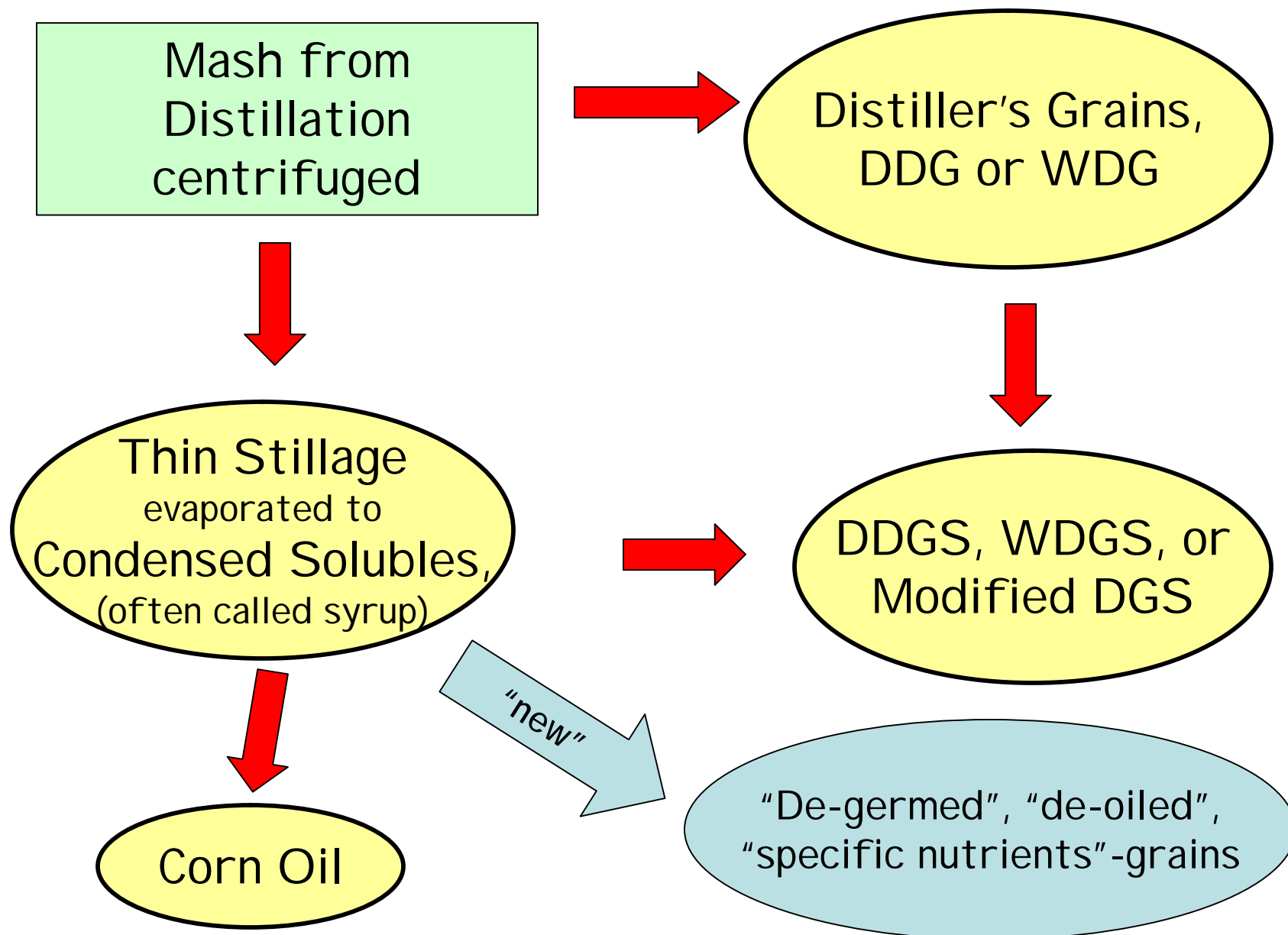
Dry Grind Process ~ 17 # DDGS



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Using accepted AAFCO terminology reduces marketplace confusion

For example, DDGS:

AAFCO 27.6:

“Corn Distillers Dried Grains with Solubles is the product obtained after the removal of ethyl alcohol by distillation from the yeast fermentation of a grain or a grains mixture by condensing and drying at least $\frac{3}{4}$ of the solids of the resultant whole stillage by methods employed in the grain distilling industry”

DDGS - markets

- The big three questions:
 - How much will we make?
 - How much can we use?
 - Where are the markets?

DDGS - markets

- The big three answers:
 - How much will we make?
 - **A lot**
 - How much can we use?
 - **All of it**
 - Where are the markets?
 - **All over**



DDGS – theoretical maximum market volume estimates*:

**Based on typical inclusion levels in nearly 100% of animal consuming units*
million metric tonnes



4 MMT



5 MMT



6 MMT

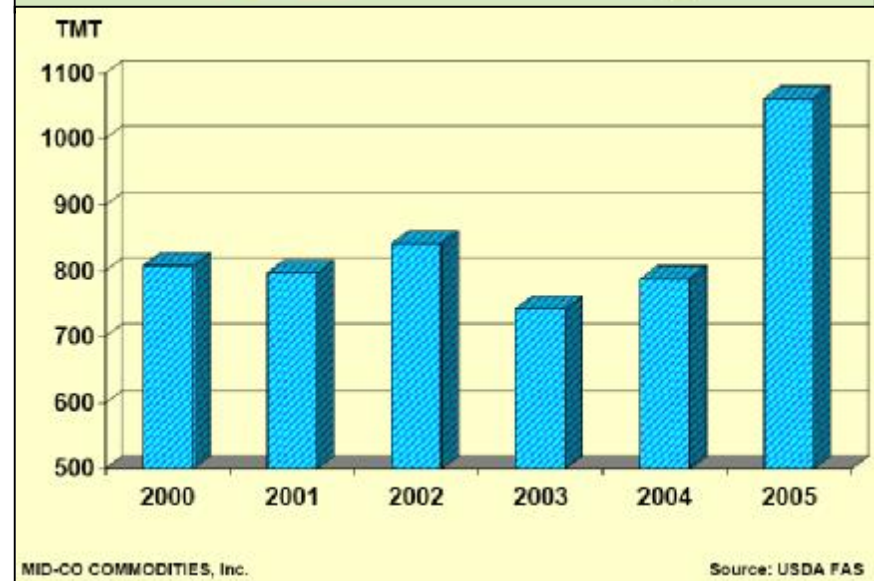
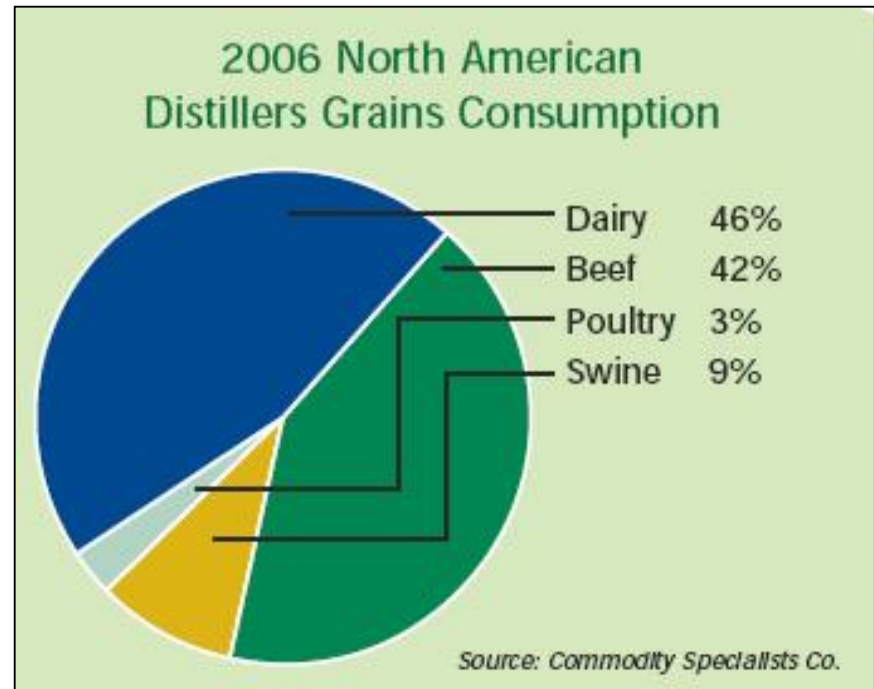


20 MMT

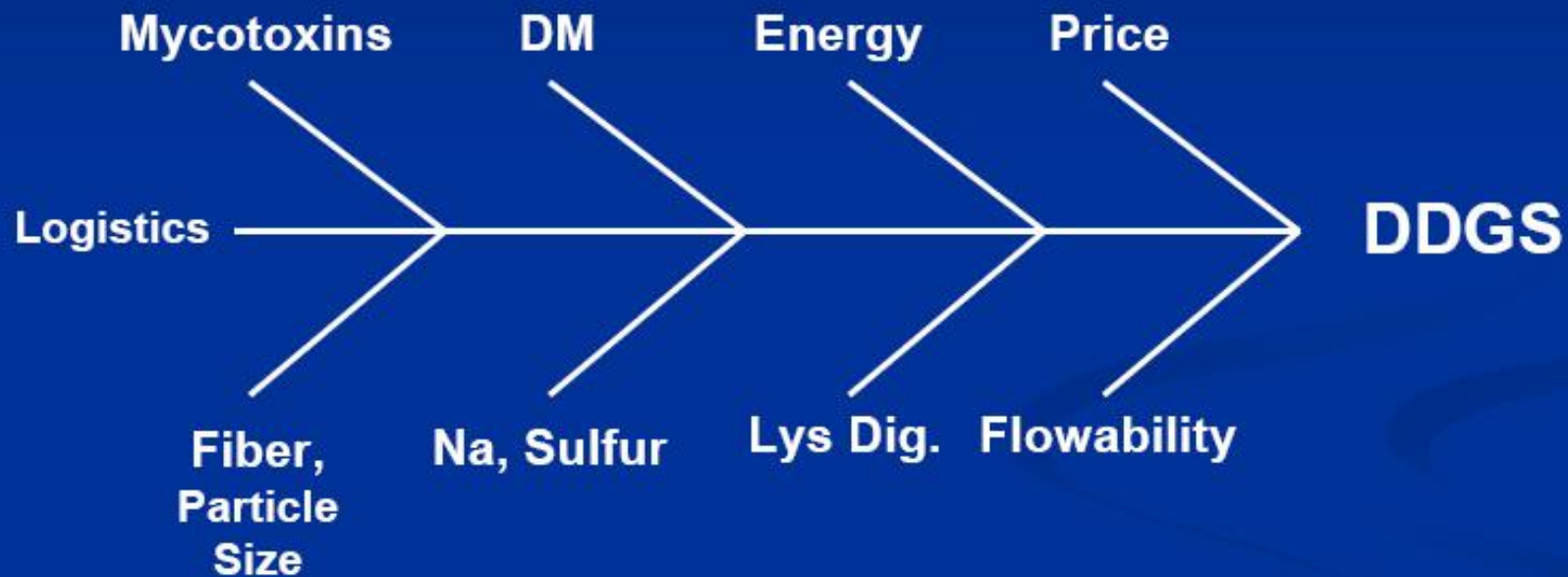
Theoretical potential use:

- Domestic feed use 35 MMT
- Exports 2 – 4 MMT
- Non-feed uses ???

Total 36 - 40 MMT



Can We Feed More DDGS?



The answer is yes, but.....

When high levels of DDGS inclusion are being used, the risk associated with variability becomes greater.

Batal, DGTC Symposium, 2007

Distillers Grains price trends

- Often stated as a percentage of corn price
 - **35.7 bu/ton @ \$3.65 = \$130.35**
 - **DDGS @ \$125 = 96%**
- Interesting way to look at historical prices
 - Has tended to be slightly to moderately higher than corn
- Not too good at predicting future prices
 - Because corn is just one of the ingredients distillers grains replaces in the diet
 - Because of the rapid increase in supply of distillers grains products

Value of By-Products for Beef



		Cost	DM%	NEg	CP%	Ratio
Corn per bushel		\$3.05	88.0	66	9.5	
Hi Pro Soybean Meal per ton		\$320	89.0	65	53.4	25%
Feed Grade Urea per ton		\$490	99.0	0	286	75%
		100% DM		Maximum Value per Ton, delivered		
Commodity	DM %	NEg Mcal/cwt	CP %	Energy Value/ton	Protein Value/ton	Total Value/ton
Corn Screenings	86	52	9.5	\$67	\$21	\$88
Corn Gluten Feed, Dry	90	63	20	\$85	\$47	\$132
Corn Gluten Feed, Wet	40	63	20	\$38	\$21	\$59
Cottonseed, Whole	91	72	23	\$98	\$54	\$153
Distillers Grains, Dry	88	66	28	\$87	\$64	\$151
Distillers Grains, Wet	30	66	30	\$30	\$23	\$53
Distillers Syrup	30	80	30	\$36	\$23	\$59

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Value of Using 200 lb Per Ton of Golden DDGS With HiPro SBM and Dical in swine rations

Ingredient Prices		\$/ton	\$/Bu
Corn	(-173)	117.86	3.30
Hi-Pro Soybean Meal	(-25)	190.00	
Dicalcium Phosphate, 18.5%	(-5)	400.00	
DDGS (Golden)	(+200)	125.00	
Limestone	(+3)	125.00	

Savings from using 200 lb DDGS	1.35	/ton
Break-Even Price for DDGS	\$ 138.50	/ton DDGS

DDGS – inclusion levels

Bold = typical; *Italics* = maximum



10 - 15%
20% (G/F)
40% (gestation)



5 – 12 %
15%



5 – 15%
20%



10 - 25%
40%

Non-feed uses of Distillers Grains

- Internal
 - Fuel source for process and/or drying
 - Btu value of distillers grains
- External
 - Oil removal for bio-diesel or other uses
 - Nutrient stream extraction
 - For industrial uses
 - Neutra- or pharma- ceutical uses
 - Industrial uses of distillers grains
 - Fertilizer
 - Fiber board or other construction uses
 - Human food use
 - Limited to “food grade” facilities

DDGS - quality

- What is the definition of quality?
 - Websters:
 1. That which makes something what it is...
 2. The degree of excellence which a thing possesses
 3. Excellence, superiority

DDGS - quality

- What is the definition of quality?
 1. That which makes something what it is...
 - Use quality feed stock
 - Use additives that are safe (approved) for feed/food.
 2. The degree of excellence which a thing possesses
 - Manage the ethanol plant as a fuel and feed (food) facility
 - SOP's for all phases of production
 3. Excellence, superiority
 - Use the best testing procedures: AFIA analytical methods study for DDGS

The growing ethanol industry is an opportunity to:

- Grow more corn**
- Raise more livestock**



Distillers Grains topics:

- Mycotoxins
 - ~ 3x level of feedstock
- Antibiotics used to control undesirable bacteria growth in process
 - FDA interest in food/feed safety
- Analytics
 - Need industry-wide adoption of testing methods
- Trading Rules
 - Updated rules being developed
- Research funding
 - Process manipulation
 - Feed and non-feed uses

Mycotoxins (1994 – 2004)

- Distillers grains collected as part of routine surveillance sampling

Mycotoxin Feed Ingredient Category	Mycotoxin	Units	Total Samples	% Positive
corn and corn by products	Aflatoxin	PPB	1471	19.44%
corn and corn by products	Zearalenone	PPB	282	7.09%
corn and corn by products	Fumonisin	PPM	665	52.48%
corn and corn by products	Vomitoxin	PPM	4	0.00%
corn and corn by products	Ochratoxin A	PPB	26	0.00%
DDGS	Aflatoxin	PPB	37	0.00%
DDGS	Zearalenone	PPB	6	0.00%
DDGS	Fumonisin	PPM	9	44.44%

Presented by Linda Benjamin of FDA at the Fuel Ethanol Workshop in St. Louis, MO, June 28, 2007.

Mycotoxins (FY07)

- Distillers grains collected as part of a special surveillance sampling

Mycotoxin	DDG from Corn	DDG from corn and milo
Aflatoxin, ppb	0/11	0/1
Zearalenone, ppb	1/1	0/0
Fumonisin, ppm	1/4	0/0
Vomitoxin, ppm	0/1	0/0

FDA Letter to Feed and Feed Ingredient Manufacturers

May 16, 2007

- The U.S. Food and Drug Administration (FDA) is taking this opportunity to remind feed and feed ingredient manufacturers of their legal responsibility to ensure that every ingredient used in their products is safe for its intended use, whether the product is meant to be used to feed animals intended for human consumption or non-food animals such as pets.
- Manufacturers are responsible for taking their own measures to ensure the safety of their products. Manufacturers should not wait for possible FDA testing of their materials as manufacturers bear the responsibility of ensuring only safe products are put on the market.

*Presented by Linda Benjamin of FDA at the Fuel Ethanol Workshop
in St. Louis, MO, June 28, 2007.*

AFIA – RFA – NCGA Report

Table 4 AFIA DDGS Analytical Method Recommendations

Moisture/Loss on Drying	
NFTA 2.2.2.5	Lab Dry Matter (105 °C / 3 hr)
Crude Protein	
^a AOAC 990.03	Protein (Crude) in Animal Feed - Combustion
^a AOAC 2001.11	Protein (Crude) in Animal Feed and Pet Food (Copper Catalyst)
Crude Fat	
AOAC 945.16	Oil in Cereal Adjuncts (Petroleum Ether)
Crude Fiber	
AOAC 978.10	Fiber (Crude) in Animal Feed and Pet Food (F.G. Crucible)
^a Methods are statistically similar and either is acceptable for use on DDGS	

Roadmap to greater distillers grains utilization:

- Ethanol industry adopts AFIA/AAFSCO distillers grains testing methods recommendations
- Increased ethanol industry investment in research to better understand “comparable nutritional value”
 - Animal species differences, inclusion levels
 - Industrial and human food possibilities
 - Export customer expectations
- Satisfy the three “C’s” of the feed ingredient marketplace for your ethanol plant’s customers:
 - Consistency of **quality**
 - Consistency of **quantity**
 - Consistency of **price**

Roadmap to >22 MMT utilization:

Sources of information:

- Industry organizations-
 - Distillers Grains Technology Council
 - www.distillersgrains.org
 - US Grains Council
 - www.grains.org
 - American Feed Industry Association
 - www.afia.org
 - National Corn Growers/Corn Board
 - www.ncga.com
 - Other grain boards
 - Renewable Fuels Association
 - www.rfaethanol.org
 - American Coalition for Ethanol
 - www.ethanol.org
- Universities across the continent



Thank You

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