

DDGS

A Growing Opportunity

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Land O' Lakes Feed

Vision:

“To be the leading animal nutrition company in North America, utilizing world-class operating systems, meeting the demands of coordinated food chains.”

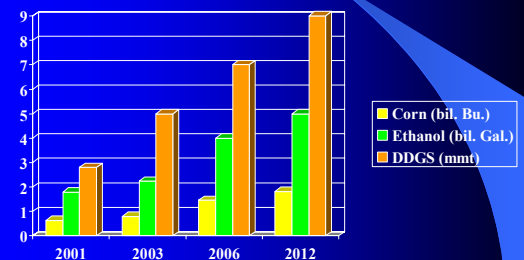
- ❖ North America's largest feed company
- ❖ Acquisition of Purina Mills (Oct. 2001)
- ❖ #1 manufacturer of animal milk replacer

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United States Ethanol Outlook

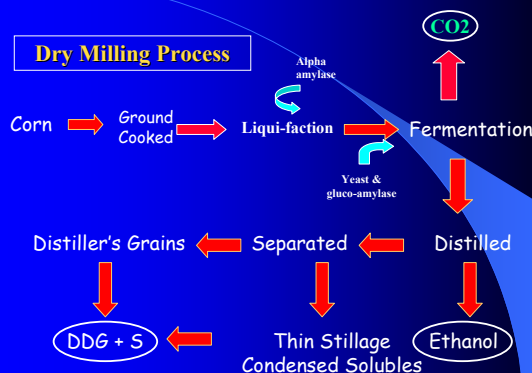


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Dry Milling Process



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Nutrients Concentrate:

- ❖ 56 pounds of corn.
- ❖ remove the starch.
- ❖ add remnants of enzymes and yeast added to process.
- ❖ nutrients “concentrated” into 17 - 18 pounds of DDGS

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DDGS Nutrient Profile Comparison

Grains fraction compared to Solubles fraction*

Nutrient	Grains Fraction	Solubles Fraction
Dry Matter, %	34.3	27.7
Crude protein, %	33.8	19.5
Crude fat, %	7.7	17.4
Crude fiber, %	9.1	1.4
Ash, %	3.0	8.4
Calcium, %	0.04	0.09
Phosphorus, %	0.56	1.30

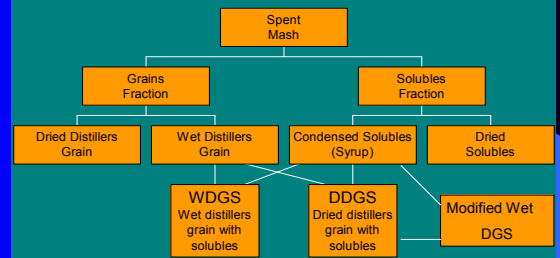
*Göhl, Knott, and Shurson: Random samples from 6 Minnesota ethanol plants taken over a three week period and tested at Iowa Testing Laboratories, Eagle Grove, Iowa. Mean values reported.

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Dry-Mill Ethanol Co-products



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Why use a Co-Product?

Get similar nutrition at a lower cost

OR

Get enhanced performance at a positive return on investment

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Other Factors that influence use of DDGS:

Health & Performance:

- ❖ Swine
 - Improved gut health
 - Reproductive performance
- ❖ Cattle
 - Reduce acidosis & laminitis
- ❖ Poultry
 - Meat & egg color issues

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DDGS use factors:

- ❖ Must use dried products to accommodate current feeding systems for non-ruminants
- ❖ Understand available lysine
 - Lysine = .78% (avg of 11 samples)
 - Ranged from .65 to .97% lysine
- ❖ Mycotoxins can survive process; purchase from known source.

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Protein Value of Distillers Grains for Ruminants

- ❖ 25-30% of DM
 - More than old "book values"
- ❖ Good source of Ruminally Undegradable Protein (~55% RUP/UIP)
 - RUP/UIP is slightly less for wet vs. dried
- ❖ Protein quality:
 - Fairly good quality (color/heat damaged)
 - Lysine may be limiting

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Energy Value of Distillers Grain for Ruminants

- ❖ May be decreased slightly with drying
- ❖ May vary with addition of solubles
- ❖ May vary with source plant
- ❖ Will vary with fat content
- ❖ Will vary with inclusion rate
- ❖ Is dependent upon associative effects of feedstuffs
- ❖ Calculated to be 100-150% that of corn

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Condensed Distillers Solubles

- ❖ Added to back to dried & wet grains
- ❖ Available as a liquid feed ingredient/conditioner
- ❖ Dry matter basis
 - Typical DM 25 – 50% (30)
 - 25-29% protein
 - 9-15% fat
 - 4% fiber
- ❖ Excellent source of vitamins and minerals (phosphorous and potassium)
- ❖ Highly palatable
- ❖ Dairy = 5% of DM
- ❖ Beef = 10-15% of DM

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FEEDING RECOMMENDATIONS DISTILLERS GRAINS (Beef)

- Maximum 6-15% of diet DM as Protein Source (1-2 lbs/d)
- Maximum 20-40% of diet DM as Energy Source (4-8 lbs/d)
- Maximum 30% of diet DM for cows (8 lbs/d)
- Balance CP, DIP, UIP
- Watch Mineral Balance (Ca:P)
- Effective NDF content of distillers grains is limited
 - ❖ Does not replace all roughage sources

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Example Ration Considerations for Dairy Cattle

Diets containing 50:50 forage:concentrate

1) If equal proportions of Alfalfa & Corn Silage:

Distillers Grain can replace most or all protein supplement

2) If mostly corn silage:

More Distillers Grain can be fed but may need some other protein supplement, check Lysine, & P

3) If mostly alfalfa:

Less Distillers Grains likely needed to supply diet CP

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DDGS in Laying Hens

- ❖ No adverse effect on production
- ❖ No effect on egg weights
- ❖ No significant effect on shell quality
- ❖ Inclusion levels of 10 – 12% entirely feasible, with little or no risk to production
- ❖ Research from U. of Georgia; reported by Dale & Batel, 2002.

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DDGS in Broilers

- ❖ Chicks fed 0, 6, or 12% DDGS diets
- ❖ No significant difference in weight gain
- ❖ Comparable growth and feed conversion
- ❖ No difference in carcass yields
- ❖ "new generation" DDGS is highly satisfactory for broilers at levels to 12%
- ❖ U. of GA; 2002; Dale, Batel, & Lumpkins

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DDGS in Poultry

- ❖ Broilers could use about 1 pound per bird
- ❖ Laying hens could consume about 8.7# per hen per year, or about 4300 tons of DDGS/million hens/year.

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DDGS use in Swine Diets

- ❖ Competitive price
- ❖ Increasing availability
- ❖ Improved quality, consistency
- ❖ Observed health benefits

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Land O'Lakes Feed Suggested Swine Ration Inclusion Levels:

- ❖ Nursery: 5% max.
- ❖ Grow-Finish: 10% max.
- ❖ Sow Gestation: 20% max.
- ❖ Sow Lactation: 5% max.

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DDGS Value Comparison:

NRC vs. "Golden" DDGS

	DDGS (NRC)	"Golden" DDGS
ME, kcal/lb	1,282	1,452
C. Protein, %	27.7	26.9
C. Fat, %	8.4	9.7
Lysine, %	.62	.76
Dig. Lys., %	.29	.40
P, %	.77	.79
Av. P, %	.59	.63

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Assumptions:

Corn = \$1.93/bu
 Hi-Pro SBM = \$163.50/ton
 L-Lysine.HCl = \$70/cwt
 No added fat

Shadow Price of NRC vs "Golden" DDGS

	NRC DDGS	"Golden" DDGS
Shadow Price	\$87.73/ton	\$92.83/ton
Amount Used	106 lb/ton	165 lb/ton
Price to Use 200 lb/ton	\$66.45/ton	\$84.41/ton

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Value of Using 200 lb Per Ton of Golden DDGS

Ingredient Prices	\$/ton	
Com	\$ 76.76	\$ 2.15
Hi-Pro Soybean Meal	\$ 226.00	
Dicalcium Phosphate, 18.5%	\$ 335.00	
DDGS (Golden)	\$ 130.00	
Limestone	\$ 30.00	
Savings from using 200 lb DDGS	\$ (1.77)	/ton
Break-Even Price for DDGS	\$ 112.27	/ton DDGS

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Grow-Finish Pigs Fed Diets Containing DDGS

	No DDGS	10% DDGS
Pigs in	993	988
Pigs Out	979	971
Daily Gain, lb	1.63	1.62
Feed:Gain	2.75	2.74
Feed cost, \$/hd	\$32.69	\$32.53

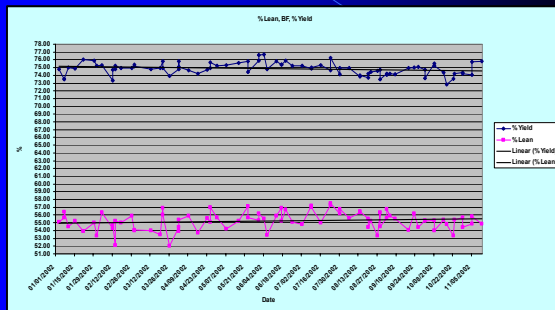
Source: Land O'Lakes Farmland Feed

Close out performance 10% DDGS diets:

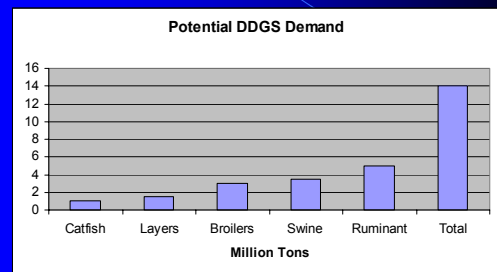
	# in	# out	Wt in	Wt out	DL	ADG	F/G	ADC	Days
Farm 1:									
Averages			58.7	253.0	3.35	1.71	2.79	4.79	113
Total head	24,676	23,852							
Farm 2:									
Averages			47.2	265.2	2.88	1.75	2.86	5.00	124
Total head	8,798	8,545							
Farm 3:									
Averages			51.5	259.2	2.33	1.74	2.76	4.82	119
Total head	13,887	13,563							

DDGS Cut-out Information

+11,000 pigs yield & lean data from 2002
Incorporated 10% DDGS in diets mid-year



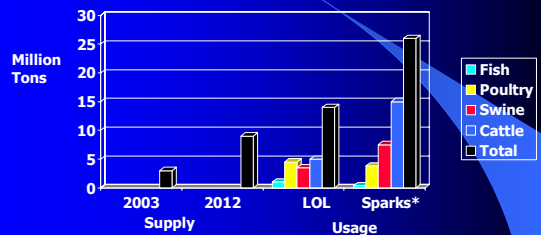
Potential use of DDGS



DDGS Market Positioning

- ❖ Feed Sales force understands ingredient well enough to help livestock producers realize benefit and to make best use of related feed products
- ❖ DDGS marketer helps direct DDGS to most appropriate end-user
- ❖ DDGS producer and end-user benefit from utilizing comparative nutritional value of DDGS

DDGS Supply/Usage



(*Sparks Cattle Maximum usage is 155 million tons.)

DDGS Value Comparison

Assumptions:

- Corn \$2.00 / bu
- SBM \$175.00 / ton
- Urea \$360.00 / ton
- Non-ruminant diets corn/SBM
- Ruminant diets typical diets with competing by-products.

Dairy Lactation	114.24
Poultry Finisher	100.09
Layer Diet	104.66
Swine G-F Diet	96.34
Beef Feedlot	108.00

Land O' Lakes commitment to research:

- ❖ Large number of Ph. D. nutritionist on staff.
- ❖ Partnering with several universities on DDGS research.
- ❖ LongView Animal Nutrition Center.
- ❖ Commerical field trials and demonstrations.

LongView Animal Nutrition Center



Land O Lakes Feed Research

- ❖ Provide:
 - New Products
 - New Feeding Programs
 - Updated Information
- ❖ Envision the Future
 - Develop supplier/industry relationships
 - Target specific opportunities for innovative nutritional solutions to industry challenges

For more information about DDGS from Land O' Lakes Feed contact:

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Thank You

