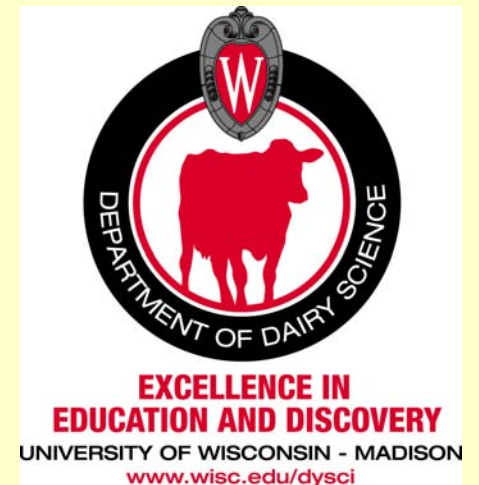


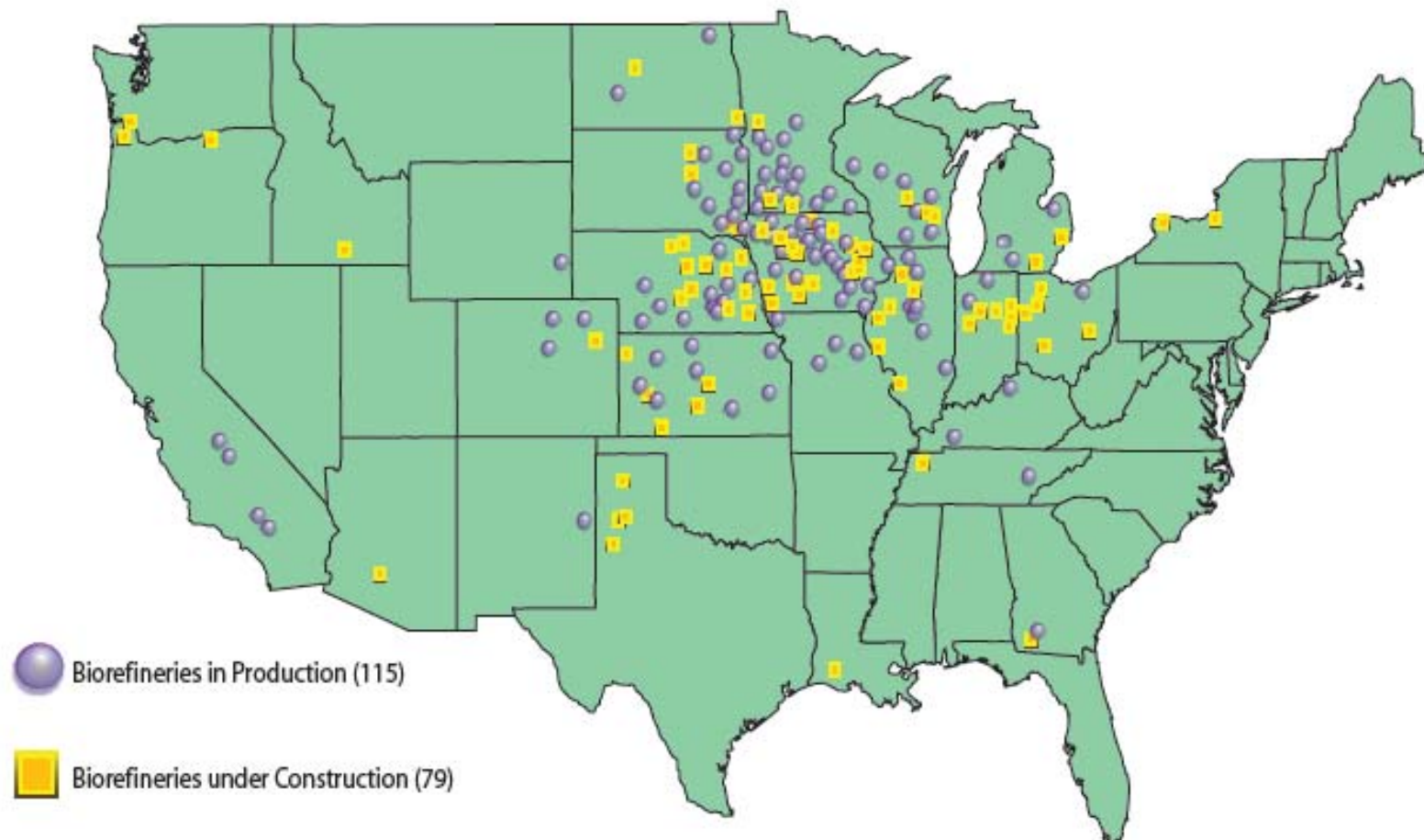
# Novel feeding opportunities with ethanol co-products

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# U.S. Ethanol Biorefinery Locations



Source: Renewable Fuels Association  
4.3.07

# Nutrient Composition of Distillers

Dairy NRC, 2001

	<u>Distillers</u>	<u>50:50 Corn:SBM Mix</u>
CP, % of DM	30 ± 3	30 ± 1
RUP, % of CP	45 - 55	30 - 40
NDF, % of DM	39 ± 8	12 ± 2
EE, % of DMB	10 ± 4	3 ± 1
P, % DMB	0.80 ± 0.15	0.50 ± 0.05

# Fat Issues With Today's Distillers

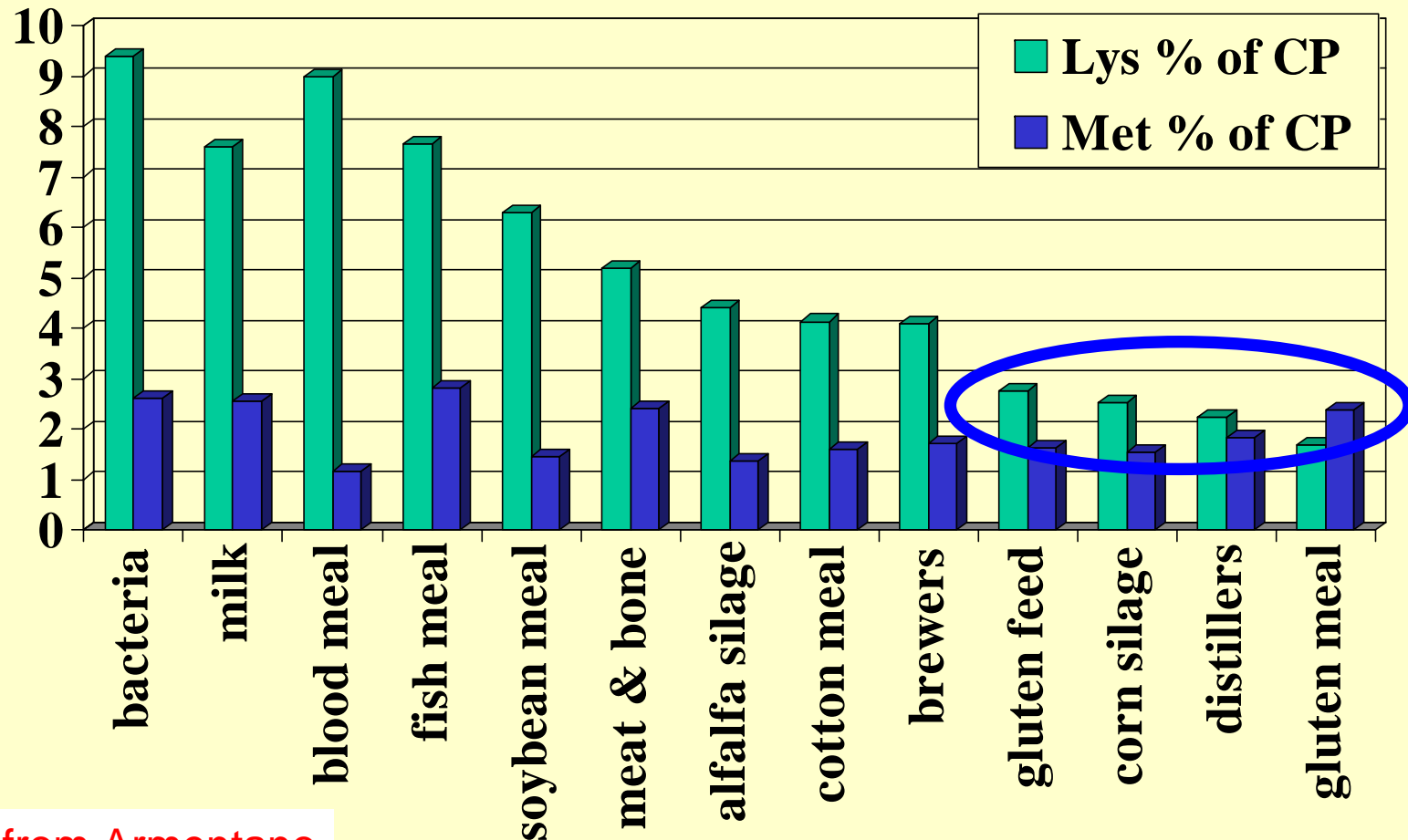
- Fat content higher than traditional tabular values
- Fat analyses may not be accurate
- Fat high in C18:2 or linoleic acid
- Fat in free-oil form
- Trying to feed greater amounts of WDG or DDG
- Other sources of vegetable fat in diets
  - i.e. basal corn & CS, WCS, FF SB, etc.
- Low ruminal pH in dairy cows due to high DMI
- Potential for depression of BF test

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# Lysine and Methionine Content of Feed Sources



Adapted from Armentano

# General Conclusions

- Lactation responses and current economics support the inclusion of distillers grains in diets for lactating dairy cows
- Inclusion at 10 to 20% of diet DM a reasonable target depending upon diet formulation constraints
- Assess variation in nutrient composition
- High Fat & P and Low Lysine concentrations an impediment to high inclusion rates

Ensiled Mixture of 56 % WDG and 44 % Dry Corn Stalks  
DM basis; Kalscheur & co-workers, 2004, SDSU





## SDSU, 2004

### Diet Composition.

<u>Item</u>	<u>Diet</u>	
	<u>Control</u>	<u>WDGCS</u>
	----- % of DM	-----
<b>Control forage<sup>1</sup></b>	<b>67.9</b>	<b>0</b>
<b>Corn, earlage</b>	<b>18.7</b>	<b>0</b>
<b>Dried distillers grains</b>	<b>11.9</b>	<b>0</b>
<b>WDGCS blend</b>	<b>0</b>	<b>86</b>
<b>Rye straw</b>	<b>0</b>	<b>12.8</b>
<b>Mineral &amp; vitamin mix</b>	<b>1.5</b>	<b>1.2</b>

<sup>1</sup>Contained 24.4% alfalfa hay, 11.8% grass hay, 15.5% alfalfa haylage, and 16.2% corn silage.

## SDSU, 2004

### Nutrient Composition.

Item	Diet	
	Control	WDGCS
	----- % DM -----	
DM, %	54.1	59.7
CP, %	18.6	18.3
NDF, %	36.2	37.8
Fat, %	5.1	10.5
NFC, %	34.1	24.6

## SDSU, 2004

### Growth Characteristics.

Item	Diet		SEM
	Control	WDGCS	
Initial age, d	159	171	4.4
Initial BW, lbs	370	404	7.2
Final BW, lbs	528	532	10.1
ADG, lbs/d	2.81 <sup>a</sup>	2.31 <sup>b</sup>	0.05

<sup>ab</sup>Means in rows with unlike superscripts differ (P < 0.10).

***Average daily gains excessive by feeding 48 % WDG.  
Diets were formulated excessive in energy***

# Distiller's & Stalks Diets for Heifers

- Long term data needed in regard to feeding high levels (> 25.0 %) of DDG or WDG to dairy heifers
- Amount of supplemental fat may be of concern
- Offers the opportunity to reduce feed cost when DDG or WDG is economical
- Conservative action is to limit DDG or WDG to 10 - 20 % in the diet

# New Generation Ethanol Co-Products

DM basis	Dakota Gold® BPX™	Dakota Gold® HP	Dakota Bran™	Dakota Gold® Corn Germ Dehydrated
CP	30%	45%	15%	17%
Fat	11%	4%	10%	19%
NDF	26%	22%	21%	24%
P	0.90%	0.40%	0.70%	1.4%

Source: [www.poetenergy.com/](http://www.poetenergy.com/); adapted from Jan.-March, 2007 spec. sheets.

# New Generation Ethanol Co-Products

DM basis	High Protein Distillers	Bran	Germ Meal
CP	min 45%	6%	17%
Fat	max 6%	2%	23%
NDF	--	72%	18%
P	--	--	--

Source: Renew Energy; Sept., 2007.

# New Generation Ethanol Co-Products

	Nutra-fiber	Probran	Glutenol	Energia	DDGS
CP	8%	11%	50%	33%	29%
Fat	2%	2%	4%	3%	10%
NDF	43%	42%	25%	31%	31%
P	Lower since germ removed				

Adapted from [www.wisc.edu/dysci/uwex/nutritn/presentn/CornMillingForEthanol.pdf](http://www.wisc.edu/dysci/uwex/nutritn/presentn/CornMillingForEthanol.pdf);  
Solaris-QTI initial estimates.

# Areas for Research & Development

- Comparative feeding trials with new generation ethanol co-products in cows & replacement heifers
- Co-supplementation of alternative protein sources (i.e. BM, Heated Soy products, rumen-protected lysine, etc.) to improve lysine status
- Use of preservatives to extend shelf-life of wet co-products
- Ensiling wet co-products with corn stalklage or corn silage
- High level use of high-fiber, low-fat ethanol co-products as forage replacers & in low starch diets



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### Highlighted Works of Interest

- [June 13 & 14, 2007 Four-State Dairy Nutrition and Management Conference Proceedings](#) (113 pages, 4.75 MB) *Cooperative Extension for: Iowa State University, University of Illinois, University of Minnesota, and University of Wisconsin*

### Spreadsheets

- [MILK2006 Corn Silage: Calculates TDN-1x, NEL-3x, Milk per ton, and Milk per acre](#) (Shaver, Lauer, Coors, Hoffman) (MS Excel Workbook, 105 KB)

### Publications

- [Coping with High Corn Prices](#) (6 pages, 53 KB) *Randy Shaver, Pat Hoffman, and Bob Kaiser*
- [Feeding Programs in High Producing Dairy Herds](#) (29 pages, 190 KB) *Randy Shaver and Robert Kaiser*
- [Lactation Performance by Dairy Cows Fed Supplemental Biotin and a B-Vitamin Blend](#) (7 pages, 163 KB) *D. N. Majee, E. C. Schwab, S. J. Bertics, W. M. Seymour, and R. D. Shaver*

### Presentations

- [Identifying Opportunities for Maximizing Forage Utilization, Forage intake, digestion and milk production by dairy cows](#) (26 pages, 126 KB) *Randy D. Shaver, Professor, Dairy Science Nutrition*

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