



TECH LINE

Subject: COPRODUCTS

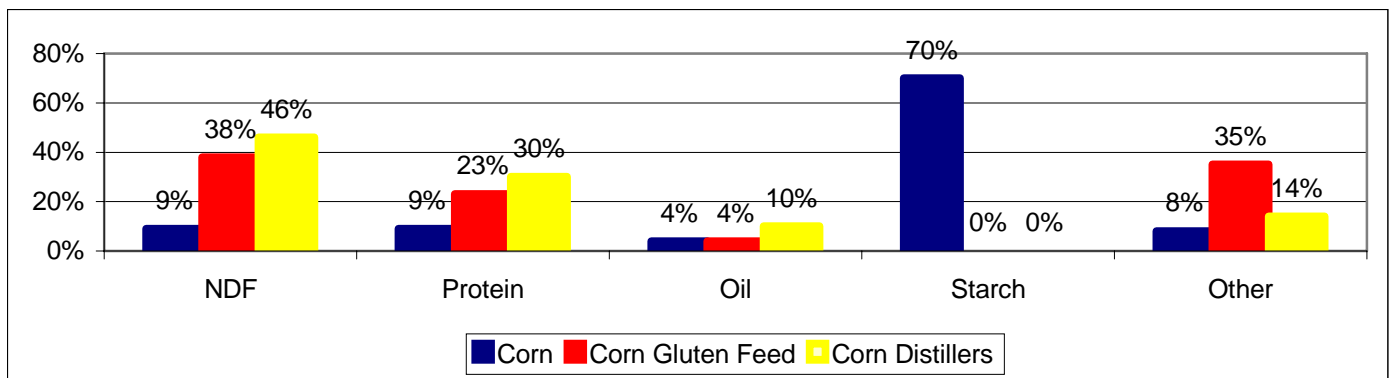
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Due to an increased interest in renewable fuel sources, there has been a tremendous expansion in the milling of corn for ethanol production. The production of ethanol from corn also produces a large amount of coproducts that are of significant feeding value to the livestock industry. This fact sheet provides a brief description of corn milling co-products and information relative to their use in beef cattle rations.

Comparison of Grain Milling Processes

	Wet Milling Process	Dry Milling Process
Investment	High	Moderate
Grain	Corn	Corn or Milo
Products	Ethanol, Starch, Sugars, Oil, Protein	Ethanol, CO ₂
Coproducts	Bran, Steep Water Corn Gluten Meal (CGM) Corn Gluten Feed (CGF) Wet Corn Gluten Feed (WCGF) Corn Steep Liquor (CSL) Corn Germ Meal	Dried Distillers Grains (DDG) Wet Distillers Grains (WDG) Condensed Corn Distillers Solubles (CCDS) Dried Distillers Grains w/Solubles (DDGS) Wet Distillers Grains w/Solubles (WDGS)

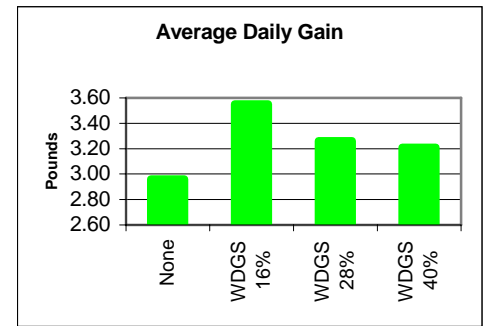
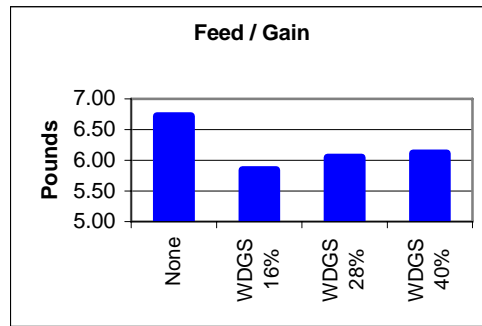
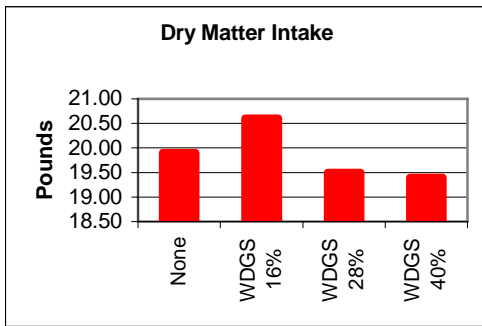
Comparison of Corn and Coproduct Composition



Typical Nutrient Analysis

Co-Product	Dry Matter %	Crude Protein %	DIP %	UIP %	NEg ^b Mcal / cwt
CGM	91	47	40	60	63
CGM60	91	66	40	60	67
CGF	91	12-25	75	25	58
WCGF	40-65	12-25	80	20	54-62
Steep	45-55	45-50	100	0	68-72
DDGS	91	25-32	25-40	60-75	68-84
WDGS	25-45	25-32	45-50	50-55	72-98
MDGS ^a	40-60	25-32	45-60	40-55	72-98
CCDS	25-50	25-32	80	20	78-98

Effect of Coproducts on intakes and performance when fed at 0% to 40% of diet.



Key for graphs

WDGS—Wet Distillers Grains with Solubles

Graph Information

Multiple research trials, such as the one shown above, suggest that feedlot performance is optimized when coproducts are fed at around 20% of diet dry matter and that higher levels may begin to lower performance. Trial data was taken from Trenkle, A. 1997. Substituting Wet Distillers Grains or Condensed Distillers Solubles for Corn Grain in Finishing Diets of Yearling Heifers. A.S. Leaflet R1451. Iowa State University

Know Where You Stand

1. What coproduct are you purchasing?
2. What is the nutritive value?
3. What nutrients do you need and don't you need?
4. Will there be a consistent supply?
5. Waste handling-the lower the digestibility, the more manure you will have to haul.
6. Variability-cattle are mobile fermentation vats. Variation is the number one enemy of good fermentation.
7. What is the cost per unit of dry matter?
8. What is the cost per unit of needed nutrient?

Evaluation of Coproducts

1. **Evaluate on cost per nutrient provided.**
2. **Shrink:** 5% to 10% for wet, possible higher, ~2% for dry due primarily to handling loss.
3. **Dry Matter:** Always price and compare on a dry matter basis.
4. **Crude Protein:** This is typically the nutrient of most economic importance.
5. **Energy:** Especially important when comparing across milling processes.
6. **Sulfur:** High levels can lead to brainer disorders.
7. **Phosphorus:** High levels will increase phosphorus load on land.

Ration Formulation Tips

1. Avoid fat levels above 5% for high roughage grower diets and above 6% for high grain finisher diets.
2. Keep dietary sulfur levels below 0.30%. This may need to be lower if water is also high in sulfur.
3. Keep dietary calcium to phosphorus ratio at 1.5:1 or greater with a minimum of 0.6% calcium.
4. Coproduct inclusion rate should be kept at or below 25% of diet dry matter (~30-35% as-fed).
5. Feed a properly formulated coproduct balancer supplement containing thiamine.



Talk to your local Hubbard Feeds Inc dealer today to learn more about feeding coproducts.