CORN

Distillers Grains

Value-added Feed Source for
Beef, Dairy Beef, Dairy,
Poultry, Swine, Sheep

NCGA
www.ncga.com

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Corn Distillers Grains

Table of Contents

This publication is brought to you by
The National Corn Growers Association

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Introduction to

Distillers Grains

The rapid growth of the dry grind ethanol industry has resulted in larger supplies of DISTILLERS GRAINS (DG) than ever before that are:

- High protein
- High fat
- Highly available phosphorus
- Competitively priced
- Environmentally friendly

One bushel of corn produces 2.8 gallons of ethanol and 17 pounds of distillers grains.

What are Distillers Grains?

DISTILLERS GRAINS ARE A COPRODUCT OF DRY GRIND ETHANOL

After high-quality kernels of corn are ground, starch molecules are converted into sugar and fermented into ethanol. The resulting coproduct is rich in essential nutrients (protein, fat, minerals, and vitamins), which are concentrated by a factor of three when compared with corn. The combination of new technology and improved quality control procedures are creating high-quality and nutritional DG!

DISTILLERS DRIED GRAINS (DDG)

Dried coarse grain fraction after removing ethyl alcohol from the yeast fermentation.

DISTILLERS DRIED GRAINS WITH SOLUBLES (DDGS)

- DG are blended with the Condensed Distillers Solubles (CDS) syrup and dried to provide:
  - Increased shelf-life
  - Improved handling

WET DISTILLERS GRAINS (WDG)

- Excellent wet feed source to beef and dairy operations within 100 miles of plant are:
  - Economically priced
  - Extended storage in silo bags possible
  - May blend with corn silage, soyhulls or beet pulp

Beef

ADVANTAGES OF CORN DISTILLERS GRAINS

- Energy value equal to corn or higher (DDG, WDG, CDS)
- Palatable and readily consumed (DDGS, WDG)
- No change to carcass quality and yield grade (DDGS, WDGS, CDS)
- Reduced feed cost (DDGS, WDG)
- Improved feed efficiency (WDG)
- Fewer subacute acidosis occurrences than low-roughage diet (WDG)
- Improved fiber digestion in rumen (DG)
- Uses include creep rations, supplement grazing and high-roughage diets, low-phosphorus diets, wintering cows or developing heifers (DG)

MAXIMUM DIETARY INCLUSION LEVELS
(% dry matter)

- Finish Rations
  - DDG.....10-20%
  - WDG.....10-40%
  - CDS.....10%
  - DG.....10-15%

- Other Beef Cattle 10-20%

KEYS TO BEST UTILIZATION OF DG

- At lower price than corn, greater profits
- Make ration changes for the nutrient content (namely protein and phosphorus)
- Maintain effective fiber in rations for finishing cattle
- Feed finish cattle to normal desired weights
- Keep WDG supply fresh

For additional information on feeding DG to cattle contact:

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ADVANTAGES OF CORN DISTILLERS GRAINS

- Economical (DDGS, WDG)
- Fed in growing and finish rations (DDGS, WDG)
- Excellent performance, efficiency and gain (DDGS, WDG)
- Improved feed efficiency (DDGS, WDG)
- No effect on carcass quality or value (DDGS, WDG)

MAXIMUM DIETARY INCLUSION LEVELS
(% dry matter)

- Growing.....10-40%
- Finishing.....10-20%

KEYS TO BEST UTILIZATION

- Make ration changes for nutrient content (namely protein and phosphorus)
- Maintain effective quantities of fiber
- Keep WDGS supply fresh
- Feed to similar finish weights
- WDG may decrease total intake in grower diets

For additional information on feeding DG to dairy beef contact:

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Dairy Beef

Dairy

ADVANTAGES OF CORN DISTILLERS GRAINS WITH SOLUBLES

- Economical addition to dairy rations
- Excellent protein source
  - More than 30% of dry matter
  - Good source of ruminally undegraded (bypass) protein
  - Increased milk production equal or higher than soybean meal diet
- Excellent energy source
  - More energy per pound than corn
  - May decrease digestive upsets (less starch in diet with highly digestible fiber and fat)

MAXIMUM DIETARY INCLUSION LEVEL
(% dry matter)

- DDG 20%
  - At more than 20-25% inclusion levels
    - May decrease dry matter intake—especially with WDG
    - May decrease milk production at greater than 30% dried DDG or greater than 25% WDG
    - May feed excess protein and possibly phosphorus
    - May still be economically advantageous

KEYS TO BEST UTILIZATION

- Uniform nutrient content and quality
- Check for evidence of heat damage
- Be aware of the nutrient content as production techniques may vary between sources
- Constant nutrient content from one batch to the next
- Lysine is first limiting amino acid

For more information on DDGS research in dairy cattle contact:

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ADVANTAGES OF CORN DISTILLERS DRIED GRAINS WITH SOLUBLES*

- Contributes energy, protein, amino acids and phosphorus
- Economically priced: least cost formulation allows up to 20% DDGS inclusion depending on price of ration ingredients (corn, soybean meal, fat, lysine and dicalcium phosphorus)

Poultry

MAXIMUM DIETARY INCLUSION LEVELS

- Broilers (chicken) 10%
- Layers (chicken)..... 15%
- Grower hen turkeys 10%
- Grower tom turkeys..... 20%

Higher dietary levels may be possible with careful adjustment of amino acids (digestible), phoshorus and energy levels.

KEYS TO BEST UTILIZATION OF DDGS

- Obtain complete and current nutrient profile from the source
- Formulate diets using digestible amino acids and set minimums for lysine, methionine plus cystine, threonine, tryptophan and arginine
- Use a Metabolizable Energy value of at least 1,250 kcal/lb
- Adjust phosphorus bioavailability to 65%

*Note that the recommendations are for conventionally produced DDGS. Other ethanol production methods utilizing corn fractionation, removal of corn oil, or removal of fiber will change the nutrient profile considerably.

For more information on DDGS research and utilization in poultry diets, visit the University of Minnesota Web site: www.ddgs.umn.edu.
Or contact:

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Swine

ADVANTAGES OF CORN DISTILLERS GRAINS WITH SOLUBLES

- Economical source of energy, amino acids and phosphorus
- Adding 200 lbs. DDGS and 3 lbs. limestone per ton of a grower diet can replace approximately
  - 177 lbs. corn
  - 20 lbs. soybean meal
  - 6 lbs. dicalcium phosphate
- May reduce gut health problems from Ileitis (*Lawsonia intracellularis*) in grow/finish pigs
- Reduces excreted phosphorus level in grow/finish pigs fed 20% DDGS and phytase diets
  - May increase litter size weaned and piglet growth rate when fed to gestating and lactating sows at recommended levels
  - In corn/soybean meal diets at greater than 20% DDGS may reduce pork fat quality
  - Without phytase may see excreted phosphorus level increase

MAXIMUM DIETARY INCLUSION LEVELS
(% dry matter)

- Nursery (greater than 15 lbs.) 25%
- Grow/finish pigs.....20%
- Lactating sows.....30%
- Gestating sows 50%

Formulate diets by digestible amino acids and available phosphorus from highest nutritional and economic value DDGS.

KEYS TO BEST UTILIZATION of DDGS

- Nutrient content and digestibility varies among sources
  - Specify desired minimum nutrient levels
  - Minimize supply sources
  - Get complete nutrient profiles from supply source
  - Monitor quality and color (golden desired)
  - Average particle size less than 700 microns to avoid bridging in bins and feeders

For more information on DDGS nutrient profiles by supply source, research and utilization in swine diets, visit the University of Minnesota Web site: www.ddgs.umn.edu.

Or contact:

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Sheep

ADVANTAGES OF CORN DISTILLERS GRAINS WITH SOLUBLES

- Cost competitive source of protein and energy in lamb rations
- Excellent feedstuff to add protein and energy to ewe rations
  - Especially those based on lower-quality roughage feedstuffs
  - Low level of copper

MAXIMUM DIETARY INCLUSION LEVELS
(% dry matter)

- Lamb finishing rations 10%
  - Higher inclusion levels may be economical but generally reduce intake and potential performance (may result from higher fat intake)
  - Total calcium/phosphorus ratios important to reduce risk of urinary calculi (DDGS increase phosphorus levels)
  - Soyhull/DDGS rations can be safely self-fed (South Dakota State University)

- Ewe rations based on low-quality roughages
  - Economically used to formulate a balanced ewe ration
  - Advantageous in lactating ewe low-quality roughage diet compared with alfalfa hay (Iowa State University)
  - Daily intake variation on ad libitum CDS may result in acidosis or digestive disorders

For more information on DDGS research in sheep contact:

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