

Corn Milling, Processing and Generation of Co-Products



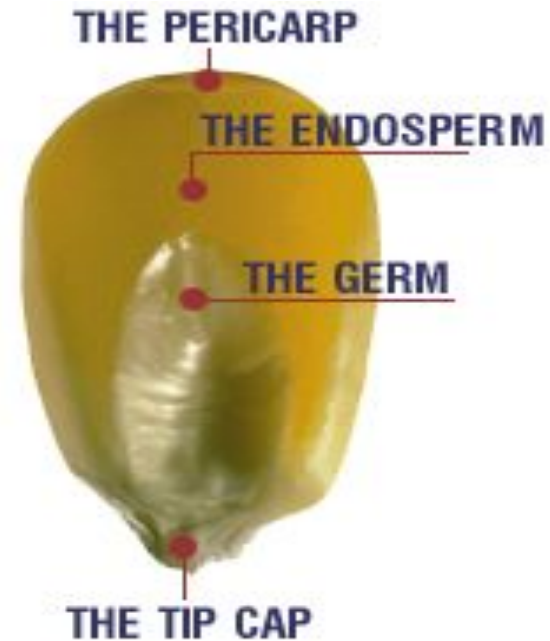
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Minnesota Nutrition Conference
Minnesota Corn Growers
Association Technical Symposium
September 11, 2001

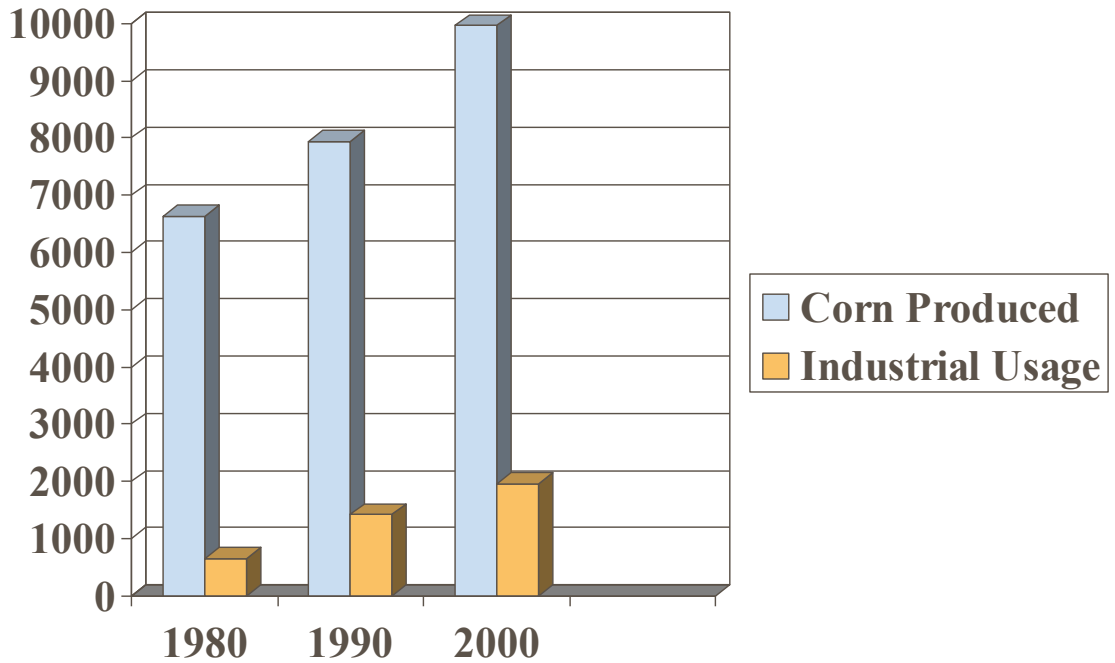


Components of Yellow Dent Corn

Starch	61.0 %
Corn Oil	3.8 %
Protein	8.0 %
Fiber	11.2 %
Moisture	16.0 %



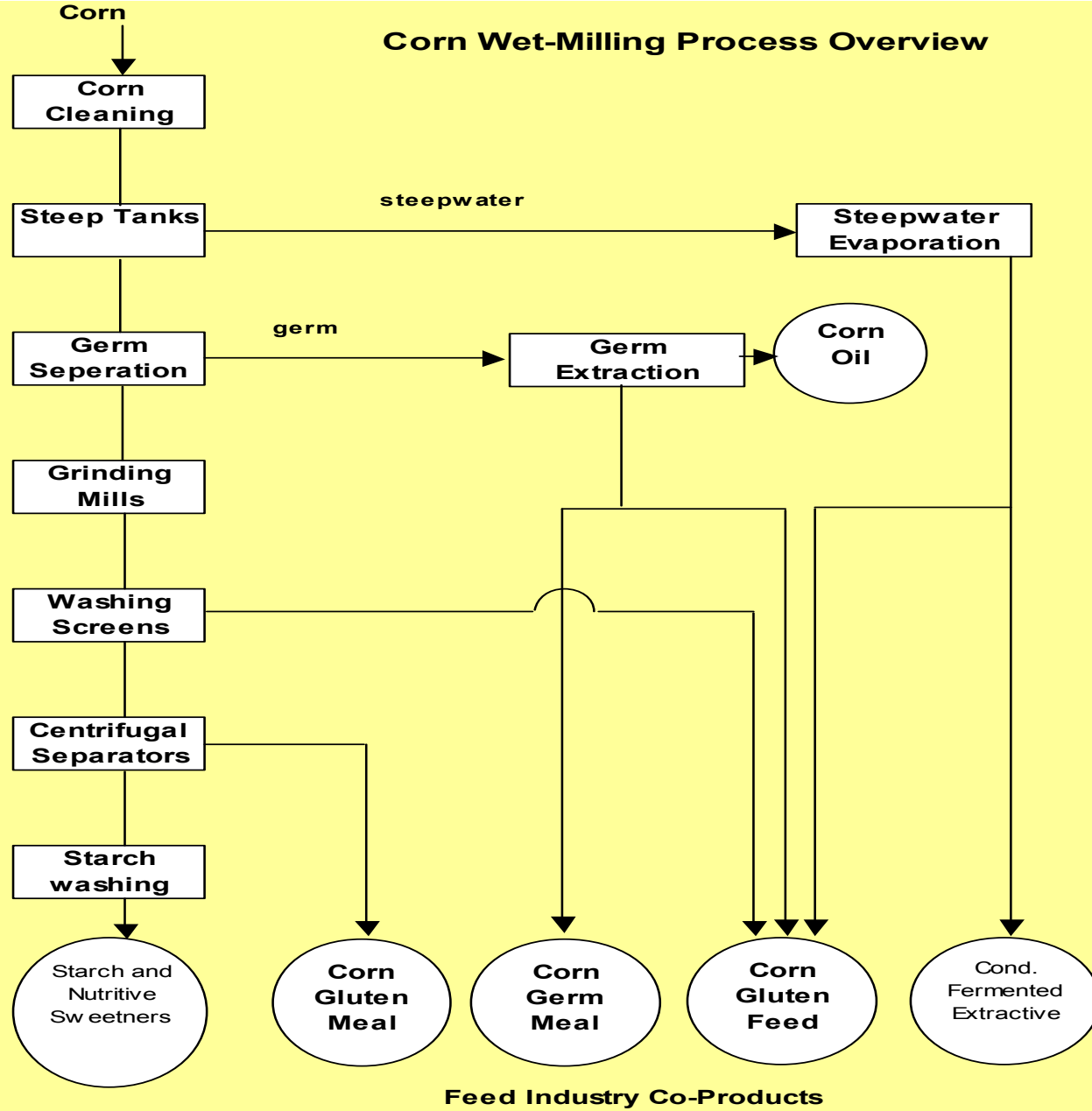
Industrial Usage of Corn Produced (MM bushel)



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Corn Wet-Milling Process Overview



Feed Industry Co-Products

Wet-Milling Average Yield Per Bushel



- Starch 31.5 lbs
- Gluten Feed 12.5 lbs
- Gluten Meal 2.5 lbs
- Corn Oil 1.6 lbs



Condensed Corn Fermented Extractives

- Sometimes called “Corn Steep Liquor”
- Liquid Feed Ingredient
- Protein value 25% at 50% solids
- Combined with corn gluten
- Pellet binder
- Source of B-vitamins and minerals



Corn Germ Meal

- Typically analyzes 20% protein, 2% fat, and 9.5% fiber.
- Amino acid balance valuable in poultry and swine.
- Used as a carrier of liquid feed ingredients.



Corn Gluten Feed

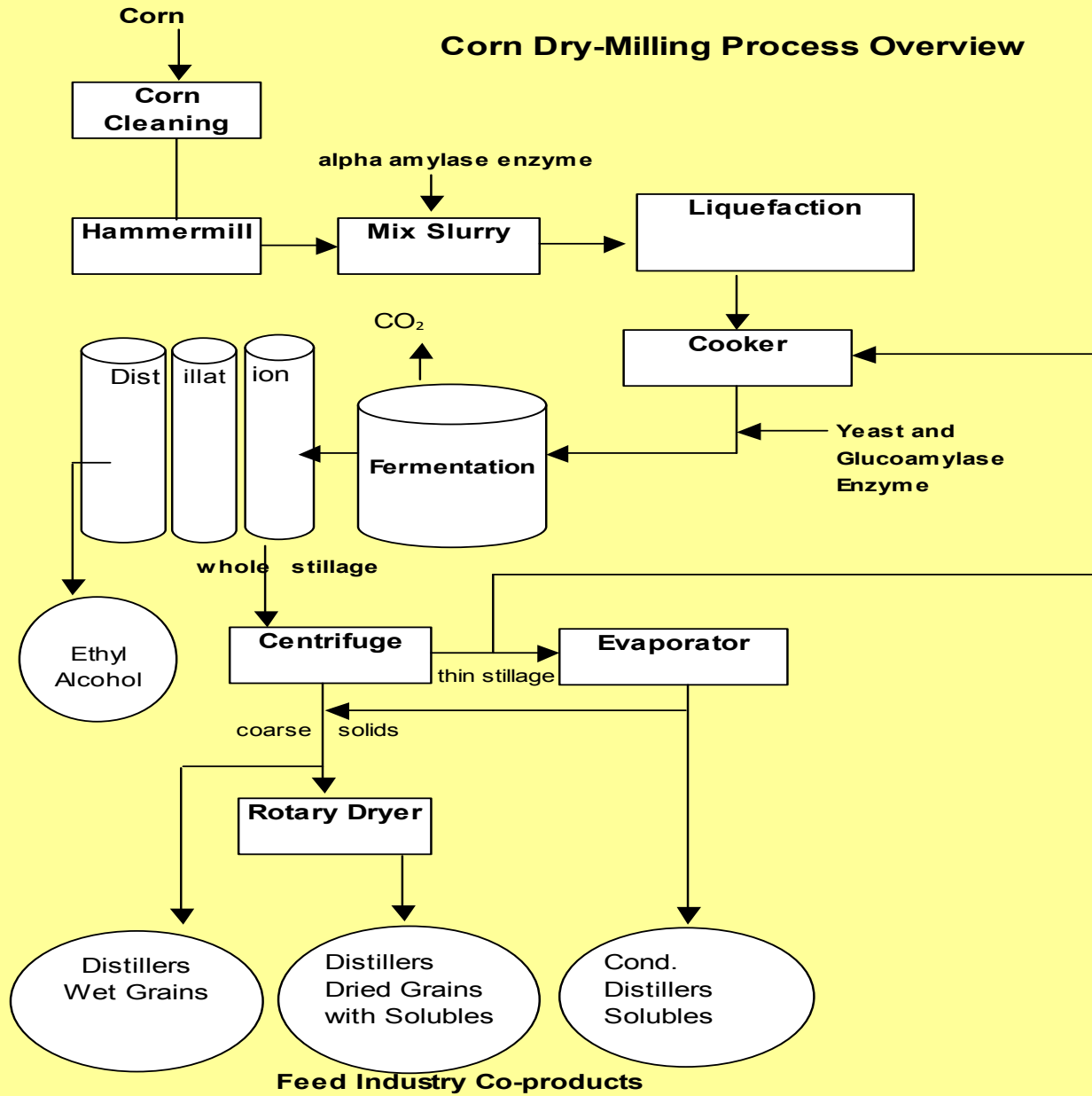
- Combined streams
- Typically analyzes 21% protein, 2.5% fat, and 8% fiber.
- Dried in rotary dryer and pelletized
- Often sold wet
- Widely used for animal feed



Corn Gluten Meal

- Typically analyzes 60% protein, 2.5% fat and 1% fiber
- Valuable source of methionine
- Xanthophylls for “yellow” poultry
- High rumen by-pass protein for beef and dairy

Corn Dry-Milling Process Overview



Dry-Milling Average Yield Per Bushel



- Ethanol 2.7 gallons
- DDGS 18 lbs
- CO₂ 18 lbs



Corn Condensed Distillers Solubles

- Mostly added to dried grains
- Available as a liquid feed ingredient
- Dry matter basis 29% protein, 9% fat and 4% fiber. Typical DM 25 – 50%
- Excellent source of vitamins and minerals, phosphorous and potassium
- Can be dried to 5% moisture
- Highly palatable



Distillers Dried Grains with Solubles

- Can have other grains
- Has at least three fold the nutrients of the incoming grain
- Contains recycled microbial products
- Yeast provide increased vitamins, particularly B-complex group



Distillers Dried Grains with Solubles

- Typically analyzes 27% protein, 11% fat and 9% fiber
- Provide ruminants an excellent source of by-pass protein
- Sold in the wet form
- Successfully used in rations for beef, dairy, poultry, swine, aquaculture and pet food rations



Acknowledgments



National Corn
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