Fractionation Technology:
Customizing Products & Processes for Customers

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Who Is QTI?

- Quality Technology International, Inc., is a marketer of value-added feed and food ingredients to global customers.
  - QTI utilizes partnerships to develop proprietary technology that leads to products that meet QTI's customer needs.
  - Products include value-added grains (corn and soybeans), feed ingredients and probiotics/prebiotics that address performance, health and food safety issues.
- Strategy – Determine customer needs through existing businesses and seek new technologies/products that address these needs. For example:
  - Soybean meal (SBM) metabolizable energy (ME) is significantly lower than corn. DDGS is lower in protein and ME than SBM.
  - There is a need for high protein products that also have high ME. NextGenFrac™ is one way to address this need.

Technology Partnerships – The Key to New Product Development

Quality Technology International

- Strong logistics and marketing capabilities
- Co-inventor of technology (owns IP)
- Technical expertise in feed rations
- Established customer relationships with domestic and international producers

Itochu

- Japanese conglomerate with global focus in food & feed, metals & minerals, energy & chemicals, textiles, and machinery industries among others
- Strong financial position ($3.7 B net income in 2013, $76 B of assets)
- Oilseed processing capabilities
- World class logistics supply chain

AMG Engineering

- 40 years wet milling and engineering expertise
- Over $4 Billion of construction engineered
- Co-inventor of technology

Strong contribution of complimentary skills and expertise, and recognition thereof, that give partnership a high chance of success

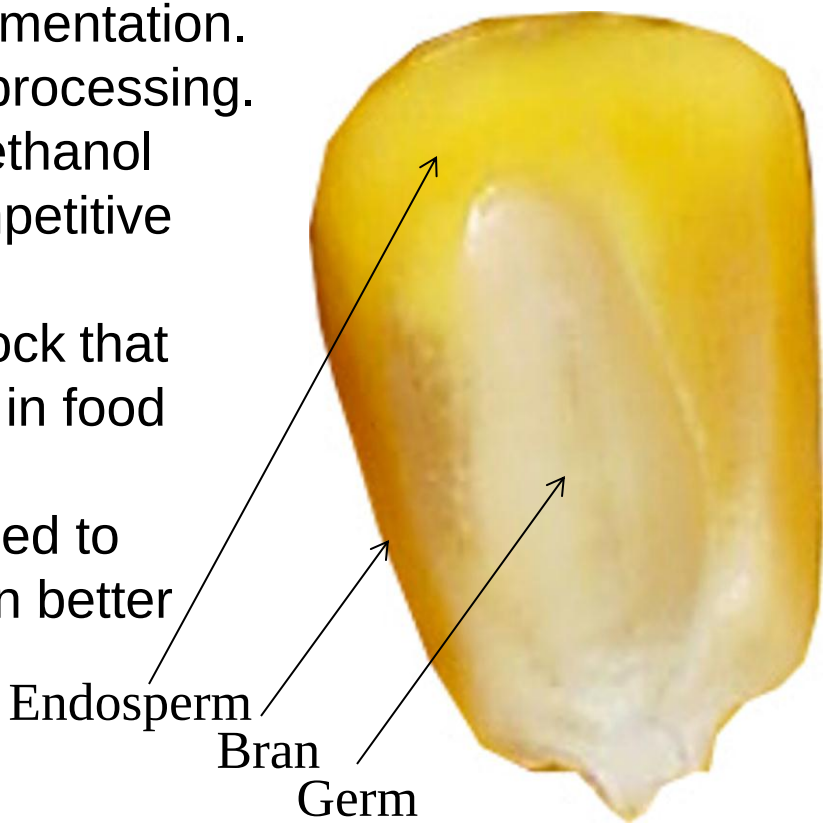
GTL Resources

- Technical expertise in corn fractionation (dry and wet milling)
- Unique/novel feed marketing expertise
- Advantaged asset (IRE) with "best in class" logistics and unique processing features
  - Close proximity to multiple oil processors and year round access to containers for Identity Preserved export sales
- Top tier industry ranking ensures long term competiveness of site
- High technical staffing levels, abnormal for ethanol industry

Principals at GTL, IRE, QTI, and AMG have long track record of working together to drive new technologies and products to market in previous ventures at Cargill, Renessen, Continental Grain, BP, & DuPont. Over 15 engineers working together on the NextGenFrac technology.

Why Fractionation?

1. "Component Separation" may be better term – concept is to make best use of corn components:
   - Ethanol is produced from starch/sugar (endosperm) in corn
   - Non-fermentables (germ and bran) have higher value if removed before fermentation.
   - Improved efficiencies may be realized by removing non-fermentables prior to fermentation.
2. A natural evolution of grain processing.
3. A point of differentiation by ethanol producers for improving competitive advantage.
4. A more efficient use of feedstock that could help address criticism in food vs. fuel debate.
5. A technology that can be utilized to develop new products that can better meet end user's needs.



NextGenFrac (NGF): Concept & Background

- Back-end oil skimming is a proven technology that adds value to co-products, but low fat DDGS is not ideal for monogastric animals.
- Front end fractionation can utilize three primary processes:

Wet Milling

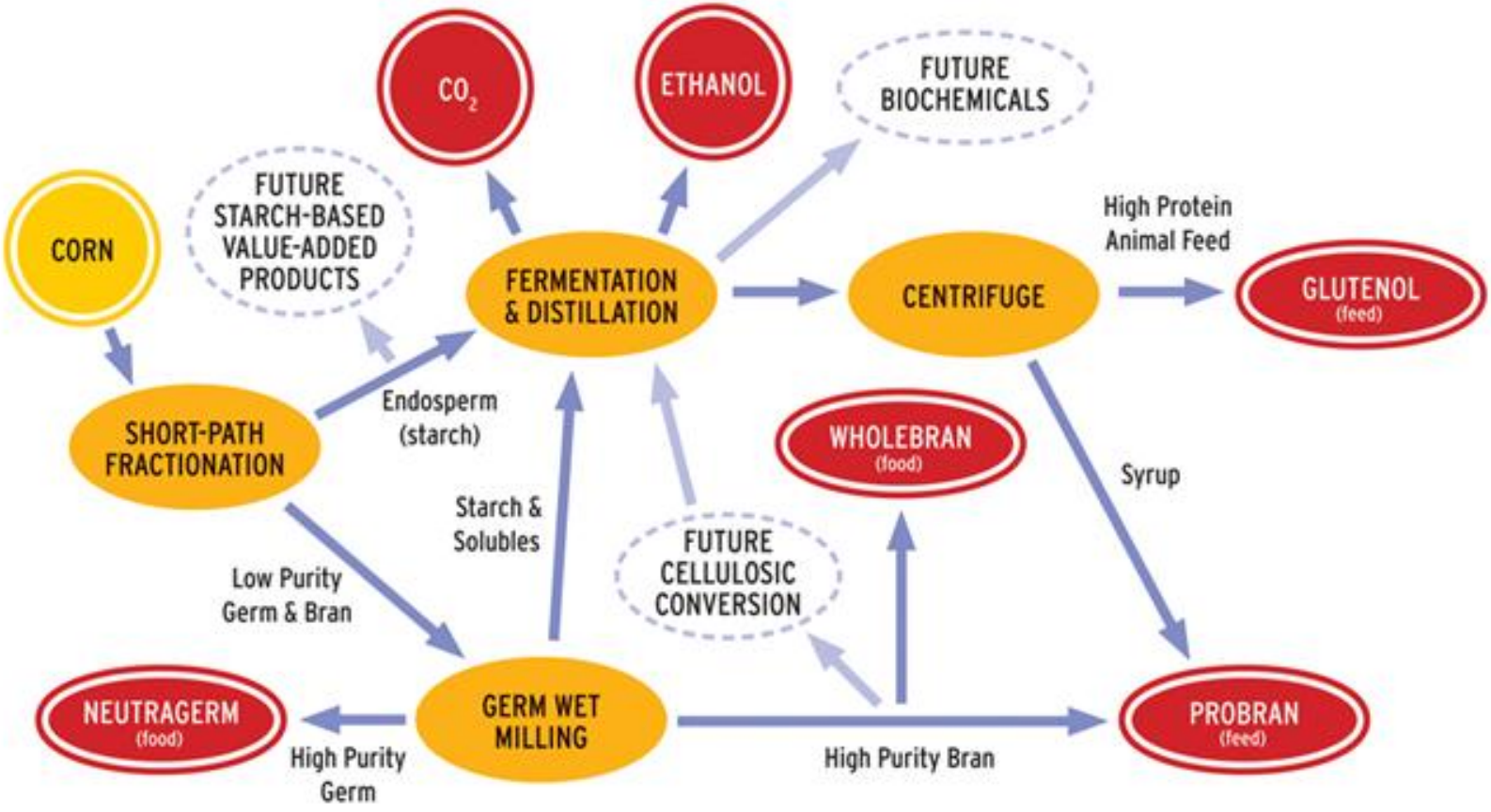
- *High value co-products,*
  low starch loss,
  high upfront
  capital

Dry Fractionation

- *Starch loss issues, low value co-products*

  - "Hybrid" fractionation
    - *Utilizes the best of dry frac and wet milling technologies*
    - *Can produce high value co-products with minimal starch loss at a relatively low capital and operating cost.*
    - *Platform technology that may allow for production of further high-value products and processes.*
    - *Can be combined with other process improvements such as fine grinding and back-end oil extraction.*

NextGenFrac™ System Schematic



NextGenFrac – Testing, Validation & Patents

- Bench top trials – University (2007)
- University pilot plant – Texas A&M & Iowa State (2007-2008)
- Pilot testing at ethanol facility (Below) – batch testing of low purity germ and bran wet milling (2009 & 2010)

- Patent #7,858,140 B2 - Processes for Recovery and Separation of Grain Pericarp from Endosperm (Paustian et al. Dec 28, 2010)
- Patent pending USSN 12/117,621 - Process for Improving Products of Dry Milling (Lohrmann et al. Filed May 8, 2008)

Demonstration Program/Plant

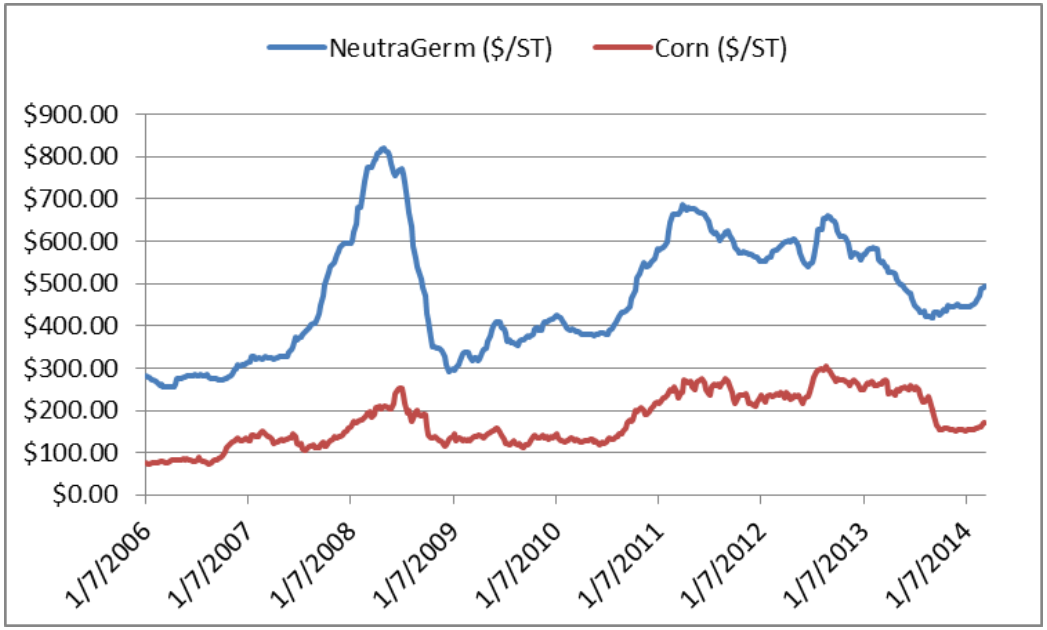
- QTI-AMG and GTL/IRE are collaborating to construct and operate a 3000 bushel/day demonstration plant.
- The goal of this program is to prove the technology and enhance the probability of success of the first commercial plant.

NextGen Frac Demonstration Program Objectives

1. Demonstrate **consistent operation** of the Demo Unit in order to determine each of the following technical performance parameters:
   a) **NeutraGerm oil content** – projected to be not less than 42% (DMB)
   b) **Fermentables recovery in starch slurry** – projected to be not less than 97.5%
   c) **Fiber yield in fiber fraction** – projected to be not less than 1.90 lb/bu
   d) **Net process makeup water** – demonstrate process can operate at neutral water balance
2. Obtain an affirmative **technology scale-up and soundness opinion** from an Independent Engineer
3. Collect sufficient technical performance data to complete a **"Schedule A" basic engineering package** and detailed engineering.
4. Conduct fermentation and downstream processing trials to **generate and characterize the Glutenol and ProBran products** (and key intermediate streams)
5. With the feeding trial performance data on Glutenol and ProBran, obtain robust feedback from potential customers and outside nutritionist(s) on the **value proposition for each product**

NeutraGerm

- High purity (+42%) corn germ for edible oil production
- QTI will offer an off-take agreement that values NeutraGerm basis daily bids for edible corn oil and corn gluten feed as published daily in the Wall Street Journal
- Further processing of de-fatted germ has the potential to produce high quality corn protein concentrates/isolates.



Bran/ Fiber

With solubles added, ProBran is a consistent, highly digestible source of concentrated NDF that can replace corn in ruminant feeds

- No SO2 – advantage over Corn Gluten Feed
- Can be pelleted or sold in meal form with solubles

WholeBran (human) or Puriden (pet foods) are concentrated sources of total dietary fiber (TDF) for higher value market segments

Cellulosic conversion to ethanol is another opportunity.

Other “bolt-on” technologies may allow for conversion to higher value food and industrial applications:

- Further deconstruction of bran/fiber produces non-caloric cellulose and hemicellulose rich fractions that are novel and highly functional viscosifiers, emulsifiers and binders.
- These can be use in various food, feed and industrial applications to replace Guar gum, Xanthan gum and other products.

Glutenol

- High protein (+45%) feed ingredient. AAFCO labeled as corn gluten meal (CGM). Target markets will be:
  - Poultry: Compared to soybean meal, Glutenol has higher energy, higher total sulfur amino acids (TSAA's), more available phosphorous and higher carotenoids.
  - Aquaculture: A non-allergenic, highly digestible and palatable protein source
  - Pets: Similar to CGM (highly digestible and palatable) but lower in sulfur (SO2)
  - Dairy: High by-pass, non-animal protein that is high in TSAA's and very palatable
- Glutenol has excellent flowability and handles well in transit.
- Golden yellow color and fine texture.
- Bulk density = 36.5 lbs/cu. ft (similar to soybean meal).

Glutenol Energy Results (Poultry)

- Commercial production of Glutenol has been tested for energy and amino acid digestibility in poultry:
  - University of Illinois (Parsons) and University of Georgia (Batal)
  - TME determined by intact rooster
  - TAAA determined by cecectomized rooster

(10% moisture basis)		GE (kcal/lb)	TMEn (kcal/kg)	CP%
SBM	UGA	4398	2750	51.0
	U of IL	4241	2602	
avg		4320	**2676**	
DDGS	UGA	5092	3075	28.7
	U of IL	4889	3074	
avg		4991	**3074**	
Glutenol	UGA	4929	3236	47.5
	U of IL	4880	3210	
avg		4905	**3223**	

- Glutenol has 20% higher TME than soybean meal for poultry
- Glutenol displaces more expensive energy ingredients such as feed fat, as well as protein sources such as corn gluten meal and soybean meal.

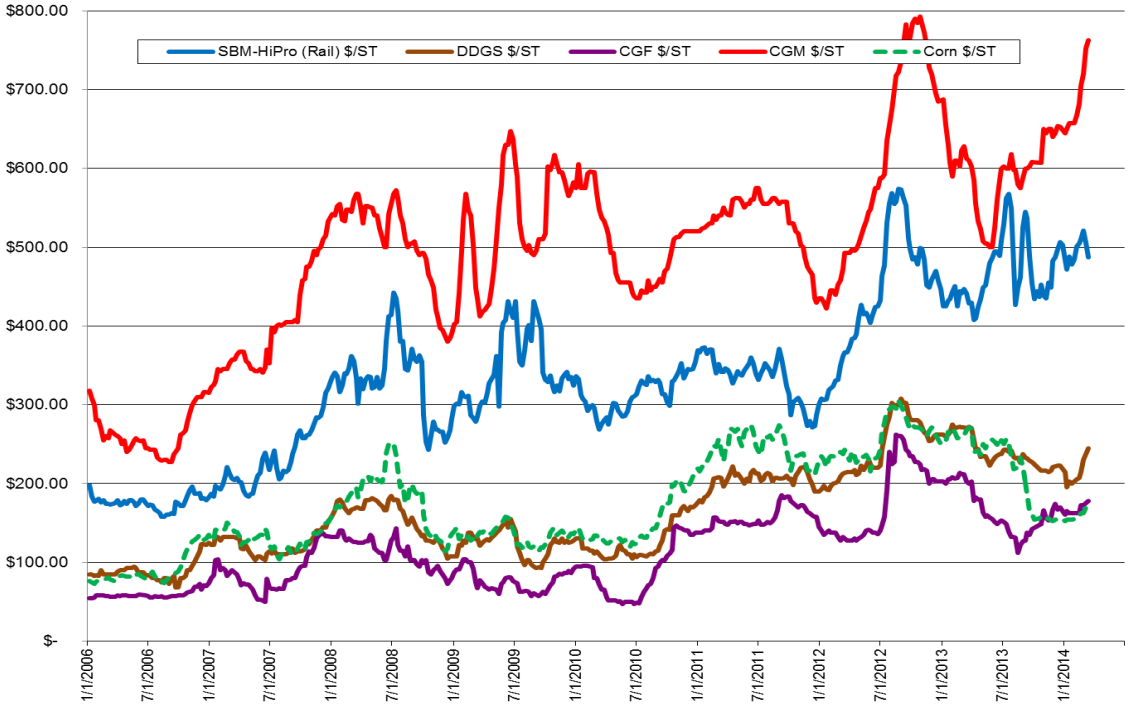
Amino Acids

- Two trial average.
- Glutenol has higher TSAA than SBM.
- Glutenol is higher in all amino acids than DDGS, especially lysine

(10% moist)	SBM avg.	DDGS avg.	Glutenol avg.
Asp	5.75	1.75	2.93
Thr	1.95	1.02	1.66
Ser	2.34	1.25	2.03
Glu	9.46	4.41	8.00
Pro	2.61	2.01	3.78
Gly	1.07	0.55	0.80
Ala	2.19	1.98	3.53
Cys	0.77	0.57	0.93
Met	0.71	0.57	0.96
TSAA	1.47	1.14	1.89
Val	2.54	1.39	2.34
Ile	2.35	1.00	1.80
Leu	3.94	3.23	6.13
Tyr	1.83	1.04	1.83
Phe	2.53	1.39	2.36
Lys	3.32	0.99	1.31
His	1.32	0.74	1.20
Arg	3.77	1.31	1.74
Trp	0.73	0.21	0.24

Glutenol versus Other Major Poultry Ingredients

	ME (kcal/lb)	Protein (%)	Lysine (%)	Meth. + Cys. (%)	Fat	Avail. Phos.	Carotene (mg./kg.)
SBM	1125	47.8	3.02	1.41	1.00	0.21	0
CGM	1700	60.0	1.00	3.00	2.00	0.18	44
Glutenol	1315	45.0	1.31	1.89	3.50	0.45	20
DDGS	1250	27.0	0.90	1.01	9.00	0.55	4
CGF	795	21.0	0.60	1.00	2.00	0.22	8



Product Positioning and Geographic Focus

- Glutenol properties suggest that two primary feed ingredients be targeted for replacement:
  - Corn Gluten Meal – high value ingredient that Glutenol is most similar to from a compositional basis
  - Soybean Meal – high volume and universally accepted ingredient that Glutenol has some key advantages over.
- Geographically, Glutenol fits best:
  - In regions that produce our targeted species (i.e. poultry, aquaculture, dairy etc) and where Glutenol's nutritional attributes have significant value.
  - Where freight cost is high. Final cost of nutrients becomes more economical for a concentrated ingredient and to a buyer who must pay high freight costs.
  - In countries that regularly source from the U.S.

Summary

- Fractionation is a logical progression for the ethanol industry that can offer improvements in efficiency, higher value co-products and strategies for ethanol producers to differentiate themselves for sustainable competitive advantage.

- Through a collaboration between QTI-AMG and GTL/IRE, the NextGenFrac technology will be thoroughly tested at a scalable level for commercialization.

- NextGenFrac is a platform technology that offers many modifications to add further value to ethanol production.