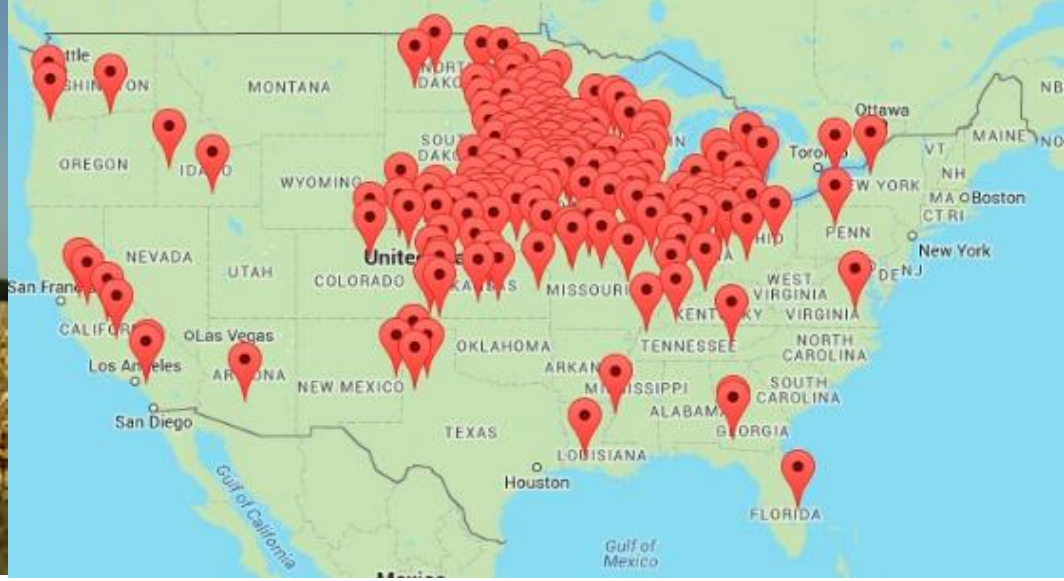


CoProMax™ Process

Bringing Additional Value and Efficiency to Ethanol Coproduct Production

Harvesting Technology LLC

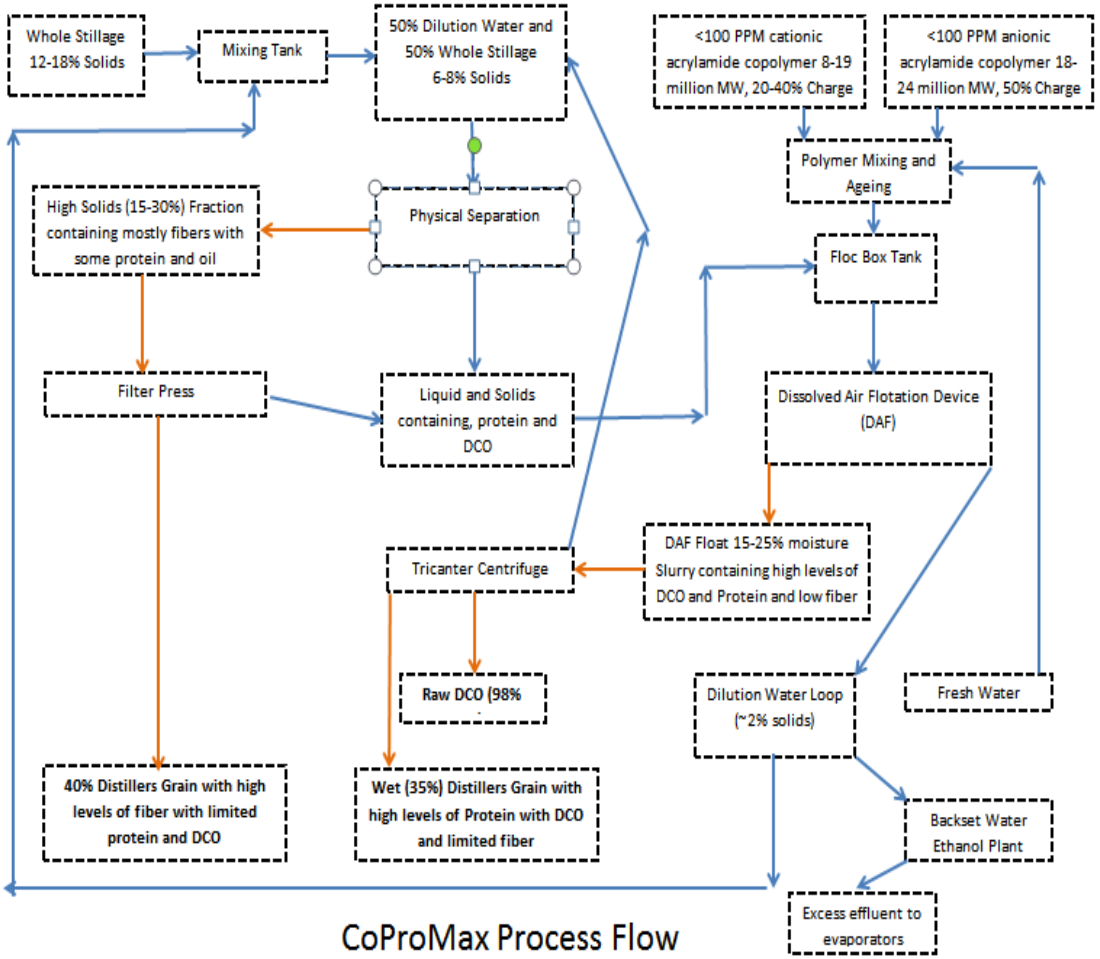
CoProMax™ History

Harvesting Technology LLC™ commercializes new agricultural production technologies:

- 2012: Established a working relationship with **Dr. Aicardo Roa** and **SoilNet™ Labs**.
- 2013: Funded Ethanol coproducts research with **SoilNet**.
- 2014: **SoilNet** Lab scale testing completed.
- 2015: **SoilNet** Patent issued: ***Separation of Biocomponents from DDGS***
- 2015: Pilot Scale Demonstration at an Illinois Ethanol Plant.
- 2016: **SoilNet** Patent Issued: ***Separation of Biocomponents from Whole Stillage***
- 2016: Commercial Demonstration under a Joint Development Agreement with a Large multi-plant Ethanol Producer at Easy Energy in Emmetsburg, Iowa.

Harvesting Technology LLC

CoProMax™ Process



CoProMax Process Flow

- ***<u>Thin Stillage is no longer produced</u>***!
  A simple mechanical extraction process to isolate ***corn kernel fiber*** eliminates the high maintenance and high power consumption centrifuges for corn distillers grain and thin stillage extraction.
- A Dissolved Air Flotation (DAF) process separates the remaining solids containing high levels of protein and DCO from the liquids recovered from the initial solids separation. These solids are separated by a Tricanter into a ***High Protein coproduct and DCO.***
- The liquids separated by the Tricanter and DAF are recycled for dilution of the whole stillage at the beginning of the CoProMax™ process and for use as low solids backset in the ethanol process, dramatically reducing the solids and liquids to the evaporators.
- The use of the recycled low solids liquids from the CoProMax processes allows a potential increase in the amount of corn introduced to the start of the fermentation process.

Harvesting Technology LLC

CoProMax™ Products

CKFiber™ a high corn kernel fiber coproduct:

- A low energy physical separation extracts 7.6 lbs. of 90% dry matter from each bushel of corn.
- The **CKFiber** is produced at 40% dry matter for sale as is or allows for reduced drying expenses.
- On a dry matter basis the **CKFiber** contains~28% protein, 6.3% fat, 55% Neutral Detergent Fiber
- The corn kernel fiber in **CKFiber** is classified as a cellulosic ethanol feedstock.

Harvesting Technology LLC

CoProMax™ Products

CoProMax™ a high protein coproduct:

- A Tricanter is used to separate the solids recovered from the DAF to provide 5.28 lbs. of 90% dry matter and 1.34 lbs. of Distillers Corn Oil from each bushel of corn.
- The CoProMax produced contains +50% protein and 8.0% fat on a dry matter basis.
- The CoProMax is produced at 30% Dry Matter

Harvesting Technology LLC

CoProMax™ Products

Distillers Corn Oil coproduct:

- The **Distillers Corn Oil** produced contains less than 2% moisture and MIUs.

Harvesting Technology LLC

CoProMax™ Commercial Demonstration

- Harvesting Technology™ recently completed commercial scale testing at a Easy Energy in Emmetsburg Iowa.
- Whole stillage flow rates equivalent to the production of one million gallons of ethanol per year were tested.
- Flow rates and outputs were instrumented to provide mass balances which could easily be sized to any scale dry grind ethanol plant.

Harvesting Technology LLC

CoProMax™ Brings Carbon Intensity Gains

A 15-25% reduction in natural gas use and 20-30% reduction in grid electricity use associated with use of CoProMax™ in a both the default LCFS corn ethanol and a modern, real plant were modeled by Riffel Consulting based on Mr. Riffel's experience.

Default Corn Ethanol Plant Incremental Results.

Reduction	CI Reduction		Credit Value
Units:	g CO2e/MJ	%	$/gal
Natural Gas (15 - 25%)	3.67 – 6.12	4.6 - 7.7%	0.027 – 0.044
Electricity (20 – 30%)	1.15 – 1.73	1.4 – 2.2%	0.008 – 0.013
Combined	4.82 – 7.85	6.1 – 9.9%	0.035 – 0.057

Advanced Corn Ethanol Plant Incremental Results

Reduction	CI Reduction		Credit Value
Units:	g CO2e/MJ	%	$/gal
Natural Gas (15 - 25%)	3.04 – 5.07	4.0 – 6.7%	0.022 – 0.037
Electricity (20 – 30%)	1.10 – 1.65	1.5 – 2.2%	0.008 – 0.012
Combined	4.14 – 6.72	5.5 – 8.9%	0.030 – 0.049

producing 100 million gallons per year could generate 33,333 – 54,079 additional credits worth approximately $3.0M to $4.9M per year.

LCFS credit value calculated based on latest weekly data available (30th January 2016 – 5th February 2017)

Harvesting Technology LLC

CoProMax™ Brings Carbon Intensity Gains

Increasing the DCO yield from 0.8 lb/bu to 1.34 lb./bu reduces emissions by 1.52 g CO2e/MJ for a default corn ethanol plant and 1.50 g CO2e/MJ for an advanced plant. This incremental reduction translates into:

- a credit value of $0.0147 - $0.0153 per gallon of ethanol

- This value likely suggests that pursuing a Tier 2 pathway is worth exploring. This approach would need to be discussed with ARB and approved.

CoProMax™ Value

The CoProMax™ (CPM) process focuses on improving the capture, yield and value of the coproducts available from ethanol production. Combining the Potential CI, operational and energy gains from a 100M GPY Plant results in savings and increased value from:

- Energy and operational efficiencies. $5,000,000
- Carbon Intensity gains from the LCFS. $4,900.000
- Carbon Intensity gains from increased DCO. $1,500,000

Total Efficiency and CI Gains $11,400.000

Harvesting Technology LLC

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