



SUGAR BEET PROJECT

Sugar Beet Sustainable and Efficient for
Ethanol Production

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SUGAR BEETS SUSTAINABLE AND EFFICIENT FOR ETHANOL PRODUCTION

Sugar beets have the potential to be a more sustainable and economical source of ethanol production than corn. Here are some of the advantages of using sugar beets for ethanol production:

- **Higher yield per acre:** Sugar beets yield about twice as much ethanol per acre as corn.
- **Less water-intensive:** Sugar beets require less water than corn, which is important in areas with limited water resources. Sugar beets, which are mostly water, use 40 percent less water for growth than corn does.
- **Less land-intensive:** Sugar beets can be grown in a wider range of climates than corn, which means that they can be grown in areas where land is more expensive.
- **Reduced greenhouse gas emissions:** Ethanol made from sugar beets produces about 30% fewer greenhouse gas emissions than ethanol made from corn. the CI score for ethanol from sugar beets is 28.5 g CO₂e/MJEtOH which is lower than the CI score for ethanol from corn, which is 34 g CO₂e/MJEtOH.

However, there are some challenges that need to be overcome in order to make sugar beets a more viable source of ethanol production. These challenges include:

- **Cost of production:** The cost of producing ethanol from sugar beets is currently higher than the cost of producing ethanol from corn. This is due to a number of factors, including the need to use specialized equipment and the fact that sugar beets are a less common crop than corn.
- **Infrastructure:** There is currently not enough infrastructure in place to support large-scale production of ethanol from sugar beets. This includes the need for processing facilities and the need for transportation infrastructure to get the ethanol to market.
- **Storage and transportation:** Sugar beets are a perishable crop, which means that they need to be processed and stored quickly after harvest. This can be a challenge in areas with limited processing capacity or where transportation costs are high.

SUGAR BEETS CAPTURE CARBON DIOXIDE MORE EFFICIENTLY THAN CORN

A study by the University of Illinois at Urbana-Champaign found that sugar beets can capture up to 1.5 times more carbon dioxide than corn per unit area. Sugar beets are a more efficient C3 crop for carbon dioxide capture than corn. Sugar beets have a higher leaf area index (LAI) than corn, which means that they can absorb more sunlight and carbon dioxide. Sugar beets also have a deeper root system than corn, which allows them to access more water and nutrients from the soil. These factors contribute to sugar beets' higher carbon dioxide capture potential."

CROP	CARBON CAPTURE POTENTIAL (TONS OF CO2 PER HECTARE)
Corn	1.0
Sugar Beets	1.5

Source:

Journal of Cleaner Production - Volume 162, 20 September 2017, Pages 1418-1429

Carbon footprint of industrial-beet sugars stored as raw thick juice for use as a fermentation feedstock

Article: <https://www.sciencedirect.com/science/article/abs/pii/S0959652617313239>

ENVIRONMENTAL & SOCIAL ACCEPTANCE

The production of ethanol from sugar beets has a lower environmental impact than the production of ethanol from corn. This is because sugar beets use less water, fertilizer, and land, and they produce less greenhouse gases.

Sugar beets have a higher public acceptance than corn. This is because sugar beets are not a food crop, and they are not seen as competing with food production.

Overall, sugar beets are a more efficient and environmentally friendly feedstock for ethanol production than corn. However, corn is more widely available and has a higher public acceptance. The best choice of feedstock for ethanol production will depend on a number of factors, such as the climate, the soil type, the farming practices used, and the cost of the feedstock.

Yield

Sugar beets have a higher yield per acre than corn.

Water

Sugar beets use less water than corn.

Fertilizer Usage

Sugar beets use less fertilizer than corn.

Land Requirements

Sugar beets require less land than corn.

Production Cost

The production cost of ethanol from sugar beets is lower than the production cost of ethanol from corn.

Ethanol Yield

The ethanol yield from sugar beets is higher than the ethanol yield from corn.

Energy Efficiency

The production of ethanol from sugar beets is more energy efficient than the production of ethanol from corn.

CAVITATION FLASH DRYING (CFD)

A PROCESS TO DRY THE SUGAR BEETS INTO POWDER

NUVIVE SYSTEM

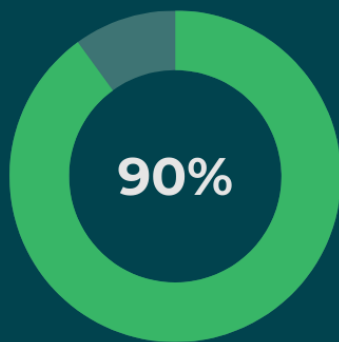
NuVive, a Michigan company, has developed a new method for storing and processing sugar beets that could help to overcome some of these challenges. Their system uses a process called "Cavitation flash drying" (CFD) to dry the sugar beets into a powder. This powder can then be stored for months or even years without losing its quality. Additionally, the powder is much easier to transport than whole sugar beets, which can save money on transportation costs.

This technology could help to make sugar beets a more competitive source of ethanol production than corn. By converting sugar beets into powder, NuVive has addressed all of the logistical issues that have prevented sugar beets from becoming a primary source of ethanol. This includes the ability to use current infrastructure that is not designed for corn, as well as the ability to use sugar beet powder as a more efficient source of ethanol with lower costs.

By resolving these challenges, NuVive has opened the door for the farming community to grow and increase their land use for the purpose of growing sugar beets. This could lead to a significant increase in the production of ethanol from sugar beets, which would help to reduce our reliance on fossil fuels and improve air quality.

BENEFITS OF THE NUVIVE SYTEM

RESOLVING CHALLENGES OF ETHANOL PRODUCTION



More Efficient

Beet sugar powder contains 90% sugar require Menominee to hydrate the sugar until liquid and start the fermentation process. No yeast.



Increased Yield

The NuVive system can help produce up to twice as much ethanol per acre as traditional corn ethanol production methods.



Reduced Water Use

Sugar beets require less water to grow than corn, so the NuVive system can help to conserve water resources.

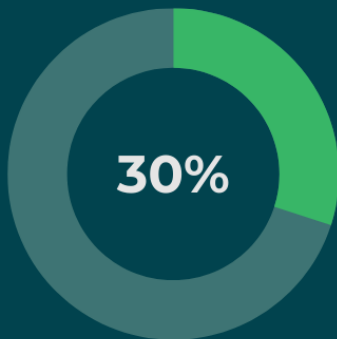
BENEFITS OF THE NUVIVE SYTEM

RESOLVING CHALLENGES OF ETHANOL PRODUCTION



Reduced Land Use

Sugar beets can be grown in a wider range of climates other than corn sugar beets ken grow to harvest pair year so the NuVive system can help to reduce the amount of land that is used for agriculture for optimal land rotation plan.



Lower Greenhouse Gas Emissions

Ethanol made from sugar beets produces about 30% fewer greenhouse gas emissions than ethanol made from corn with advance to the system we believe we can **lower CI score by one third to 19 g CO₂e/MJEtOH.**

BENEFITS OF THE NUVIVE SYTEM

RESOLVING CHALLENGES OF ETHANOL PRODUCTION



More Efficient Transportation

Sugar beet powder is much easier to transport than whole sugar beets, so the NuVive system can help to reduce transportation costs.



More Sustainable

The NuVive system is a more sustainable way to produce ethanol than traditional corn ethanol production methods but diversifying the supply chain for the feedstock increasing access to lower cost overtime.



Sustainable Up-Cycling

high-density fiber byproduct from producing ethanol from sugar beets can be used to make bioplastics. Bioplastics are made from renewable resources, and they can be used to replace traditional plastics.

THE NUVIVE SYSTEM

To make sugar beets a more viable source of ethanol production than corn



Corn ethanol is produced by first grinding corn into cornmeal. The cornmeal is then cooked with water and enzymes to convert the starch into sugars. The sugars are then fermented into ethanol by yeast.

BEET SUGAR POWDER IS MORE EFFICIENT IN ETHANOL PRODUCTION

Overall, the NuVive system has the potential to make sugar beets a more viable source of ethanol production than corn. This could lead to a significant increase in the production of ethanol from sugar beets, which would **help to reduce our reliance on fossil fuels and improve air quality**.



CALL TO ACTION

NuVive believes that the CFD technology has the potential to revolutionize the beet sugar , biofuel and bioplastic industries ,make a positive impact on the environment and the agriculture industry.

We are excited to partner with investors who share our vision and who are committed to making a difference in the world. The funding will be used to build and operate a pilot plant, and to conduct market research.



FINANCIAL PROJECTIONS

NuVive projects that the CFD technology will generate \$5 million in revenue in its first year of operation. The company plans to cultivate 1000 acres of beet sugar in incremental 100 acres at multiple locations.

The expected yield is 30 tons/acre using the CFD processing technology. The company plans to generate a stock of beet powder approximately 9,000 tons. The company expects to be profitable within three years.

INVESTMENT HIGHLIGHTS

- NuVive is developing a new and innovative technology that has the potential to revolutionize the beet sugar industry.
- The technology is more sustainable and efficient than traditional methods of storing and processing beet sugar.
- The market for beet sugar is large and growing, this technology will bring it the mainstream with the government financial support as a sustainable resource.
- The NuVive management team is experienced and has a proven track record in the food and beverage industry.
- This will validate and develop sugar beet crop as the source for ethanol production and bioplastic.

WE ARE EXCITED TO PARTNER WITH INVESTORS WHO SHARE OUR VISION AND WHO ARE COMMITTED TO MAKING A DIFFERENCE IN THE WORLD

FINANCIAL PROJECTIONS

Financial Target

\$5,000,000

Revenue in the first year of operation

Plans for Growth

1,000 acres

Cultivate beet sugar

100 acres

Incremental at multiple locations

Yield

30 tons/acre

Using the CFD processing technology

9,000 tons

Generated stock of beet powder

THE COMPANY EXPECTS TO BE PROFITABLE WITHIN THREE YEARS

**For inquiries,
contact us.**



Closing The Gap...When More Of The Less Is Needed

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