SUSTAINABLE FOOD PROGRAM

CASE STUDY

NYSP2I Supports Industrial/Organic with Providing Preliminary Information on their Food Waste Fermentation System

The mission of Industrial/Organic (I/O), located in Brooklyn, New York, is to recover the resources spent on food that is wasted, and reuse them to create a more sustainable system for food and other consumer goods. I/O is developing a unique business model of distributed organics recycling "micro-facilities", where their fermentation processes utilizes existing industrial spaces, creating cost competitive organics recycling option in an urban setting, close to the point of generation.

CHALLENGE

I/O has developed a system for lactic acid fermentation of food waste. This process, now recognized by the New York State Department of Environmental Conservation (NYSDEC) as a type of organic waste processing, takes raw food waste input and through a five day biological process, converts it into stable product, of both liquid and solid fractions.[1] Throughout this process, the material is stabilized, preparing it for reuse in new markets.

Although lactic acid fermentation itself is not a new process, the use of this process for the recycling of food waste on a large scale is relatively new, especially in New York State. New York City has already put a landfill-ban in place for specific companies, meaning these companies must find alternative, higher-value uses for this organic material. Composting and anaerobic digestion make up the vast majority of options for diversion of food waste, but they each have their own set of challenges.

Fermentation of food waste offers certain benefits over these established food waste diversion pathways, including a relatively short retention time, the ability to process pure food waste and be located in urban settings. As I/O moves from pilot to commercial scale, they sought to identify ways to optimize key process parameters, understand feasibility of the scaling up of their fermentation system, and to investigate the farming sector as a potential end market for the outputs of the fermentation process.

SOLUTION

I/O requested assistance from the New York State Pollution Prevention Institute (NYSP2I) to support them with providing preliminary information on their food waste fermentation system and the potential end market. The work performed included three phases of process optimization, each of which was designed to assess the effect of one or more variables on the efficacy of the fermentation process. The samples gathered throughout each optimization phase were analyzed at third party labs for many different characteristics, each a varying indicator for the efficacy of the fermentation process. By analyzing these characteristics throughout the three experiment phases, NYSP2I and I/O were able to optimize process parameters and make key decisions that will allow I/O to cut costs during scale up while not compromising the end products.

CHALLENGE

- Industrial/Organic wanted to understand feasibility of scaling up their food waste fermentation system and the potential end market

SOLUTION

- The work performed included three phases of process optimization, each of which was designed to assess the effect of one or more variables on the efficacy of the fermentation process
- Samples gathered throughout each optimization phase were analyzed at third party labs for many different characteristics, each a varying indicator for the efficacy of the fermentation process
- NYSP2I and I/O were able to optimize process parameters and make key decisions that will allow I/O to cut costs during scale up while not compromising the end products

RESULTS

- NYSP2I provided I/O with critical data for optimizing parts of their fermentation process
- Several cost saving opportunities were identified that, if implemented after I/O scales their system up, should not affect the quality of the output material
- The project revealed that initial feedback on the use of I/O products as fertilizers is positive from the farming community and warrants further exploration
- The liquid by product of their fermentation process may lend itself well to a natural cleaning product, due to its lactic acid, acetic acid and ethanol content

INDUSTRIAL ORGANIC

RESULTS

This collaboration provided I/O with critical data for optimizing parts of their fermentation process as well as a better understanding of their product's safety, value and competitiveness.

Through the optimization of their process, several cost saving opportunities were identified that, if implemented after I/O scales their system up, should not affect the quality of the output material.

Regarding the end market opportunities, the project revealed that initial feedback on the use of I/O products as fertilizers is positive from the farming community and warrants further exploration. Additionally, results from the nutritional testing show that there is little change in nutrient levels from the raw input material to the final output materials, indicating the fermentation process does not cause degradation in any of the major nutrients associated with plant health.

From a safety standpoint, the fermentation process met the requirements for microorganism concentration (no salmonella detected in end product) and vector attraction reduction methods (total volatile solids were reduced by more than 38% by mass) outlined in part 360-5, which outlines regulations for composting and other class A organic waste processing facilities.

In addition to these findings, a discovery was made outside of the initial project scope, which may lead to further opportunities for I/O. Specifically, the liquid by product of their fermentation process may lend itself well to a natural cleaning product, due to its lactic acid, acetic acid and ethanol content.

The results from this work performed has I/O well positioned from a process and product standpoint to continue forward with commercializing their process.

NEXT STEPS

Due to volume restrictions, testing was done on a limited number of samples duplicated across both certified and non-certified labs. Industrial/Organic is pursuing additional testing on a larger sample size to validate the findings.

[1]http://www.dec.ny.gov/docs/materials_minerals_pdf/part360final.pdf

TESTIMONIAL

"The work we have done with NYSP2I jump started our product development efforts and has prepared us to scale up our process from the lab."

- Amanda Prinzo-Weeks, CEO
Industrial/Organic, PBC

NYSP2I PARTNERS

R·I·T

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New York Manufacturing Extension Partnership

Funding provided by the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

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