Biogas production- anaerobic digestion time reduced by 90%

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The proprietary technology aims to reduce anaerobic digestion processing times by up to 90%, converting organic waste into biogas in less than two days instead of the typical 20. Vertogen's process separately optimizes conditions for different bacteria groups, rapidly producing acetic acid that is quickly converted to methane gas, making renewable gas production faster and more efficient.

Typical anaerobic digestion involves four separate groups of bacteria. The first group decomposes large solids into smaller solids; the second group takes those small solids and organic material and converts them into volatile fatty acids; and a third group breaks down the volatile fatty acids into acetic acid, not unlike vinegar.

What is advantageous is that the last group of bacteria is anaerobic. That means they cannot survive with oxygen, but they love acetic acid, which they can easily transport through the cell membrane and then convert into biogas, consisting of carbon dioxide and methane as a renewable natural gas.

These four groups of bacteria are all present in a conventional digester, which is optimized for the methane gas producers, under conditions that are sub-optimal for the other three. Consequently, it can take 20 days or more to produce methane gas and about 60% of the original solids go to waste.

That is the best that can be done under those conditions. In the past 10 to 15 years, people have been looking at trying to optimize renewable gas production, make it work faster and better. Multiple attempts to speed up and optimize the process have failed to yield phenomenal results.

That is, until Vertogen's technology, which began its journey in a lab about 25 years ago, when Vassos came across a phenomenon that resulted in extremely high yields of acetic acid that should not have existed under the observed conditions.

The current pilot testing being done with the funding from NorthX involves establishing optimal operating conditions for different sources of waste organic matter for application at a commercial scale. Animal manure, food waste from restaurants, municipal wastewater, sludges, any type of organic green waste, even that which can be decomposed, could be managed in the same way.

The research is being performed at the Annacis Research and Event Centre, a sustainable resource recovery research facility owned by Metro Vancouver and located next to their municipal wastewater treatment facility on Annacis Island, in Delta, B.C.

The ability to speed up the process for municipal wastes and convert them into renewable energy has the potential to generate significant economic benefits to municipalities while finding more optimal ways to dispose of their waste.

This technology reduces the capital cost for anaerobic digestion and increases the amount of organic waste and the amount of energy that can be generated, which means the production of renewable natural gas can be much more economical than it has historically been. Secondly, we can take existing infrastructure that has already been paid for, and we're talking hundreds of millions of dollars in a treatment plant, and being

able to make it work 10 times better than it did before; take 10 times more waste; and delay any expansion of anaerobic digestion facilities, probably for just about forever.

Vertogen Technologies, a Vancouver-based company, has received a $500,000 investment from NorthX Climate Tech to accelerate pilot testing and deployment of its Renewable Natural Gas (RNG) Accelerator at a British Columbia wastewater treatment plant within eight months.

While the Province of B.C. has expressed the desire to expand its renewable gas production capacity, one roadblock to its production has always been the time it takes to convert organic waste into biogas. However, Vancouver-based Vertogen Technologies aims to solve this issue with its proprietary Renewable Natural Gas (RNG) Accelerator, designed to reduce processing times for anaerobic digesters by upwards of 90 per cent through a high-rate pretreatment process that speeds up RNG production from wastewater sludge and organic waste. (Source: Canadian biomass & www.vertogen.ca)