

N-Viro

Using lime stabilization to process organic wastes

Biosolids is what remains of the solids after treatment of sewage at a wastewater treatment facility. Despite their name, they can be either solid or liquid form; they consist of organic matter and inorganic components.

In Canada it's estimated that about 650,000 tonnes of dry biosolids are generated annually. (That works out to about 20kg from each of us, in case you were wondering!)

Biosolids are handled in a number of different ways after treatment, including landfill and even ocean dumping. In recent years alternate uses have been pursued, primarily various forms of land application.

Land application is not without its problems. Odour generation has been a key issue in some jurisdictions and the chemical composition and quantity of undesirable chemicals has become a source of considerable debate.

Various treatment approaches can be used prior to land application. Lime or alkaline stabilization is one method. This chemical process results in rapidly increased pH through the addition of a product containing lime such as calcium oxide (CaO) also known as quicklime, or calcium hydroxide (Ca(OH)₂) known as hydrated lime. This rapid increase of pH facilitates an exothermic reaction and results in a period of high temperatures. The result is a stabilized and pathogen-reduced product that can be land applied.

The N-Viro process

N-Viro Systems Canada LP (N-Viro) has been slowly building a base of business in Canada since it was established in 1990. The company has developed biosolids processing facilities in: Leamington, Sarnia, and Niagara Region, in Ontario; and Halifax, Nova Scotia and Summerside, Prince Edward Island, in Atlantic Canada. These plants produce more than 90,000 tonnes of soil amendment annually.

N-Viro uses a patented Advanced Alkaline Stabilization with Subsequent Accelerated Drying process.

Biosolids are received and blended with 30-40 per cent (based on wet weight of biosolids) of an alkaline admixture. The admixture consists of industrial by-products such as cement kiln dust, lime-kiln dust, and/or fly ash and is supplemented by CaO. The amount of admixture added is a function of the desired temperature of the process.

After mixing the mixture is sent to a dryer.

The process results in conditions unfavourable for microbial life and results in the destruction of pathogens. It also helps stabilize heavy metals.

The material is dried to 60-65 per cent solids and is then directed to a curing area where temperatures from the chemical reactions and the heat of the dryer increase the temperature of the materials to between 52-62°C and a pH of greater than 12.

"A key difference in our process compared to other organic waste processing processes is that it takes hours rather than months to produce a viable product," states Robert Crane, Vice President of Plant Operations for N-Viro. "It can also be much less odourous."

"For us what's most important is the product that is made," continues Crane. "It's biologically stable; the pathogen reduced product has a solids content of about 60 per cent, and is a low odour, lime-like material with fertilizer qualities."

"It's the only product of its kind that carries a label approved by

"The process can take SSO as a substrate to produce a biofuel with approximately 50 per cent the fuel value of coal."



the Canadian Food Inspection Agency, Fertilizer Division. This label allows the product to be exempt from virtually all of the provincial guidelines that govern the application of Non-Agricultural Source Material (NSAM) to agricultural lands. Under this label process, it must meet a guaranteed minimum analysis."

The final product is marketed through local brokers who have an understanding of local market needs. This final product is different than compost.

"It's essentially a lime product and functions as a liming agent. The process also reduces the nutrients lost during the composting process with resulting higher levels of all nutrients including nitrogen, phosphorus, potassium and micronutrients."

"Based only on N-P-K and lime values, N-Viro has a purchased 'value' five times the amount as compost," according to Crane.

"The product delivers higher levels of nutrients making it closer to a fertilizer. It has diverse uses included building and topdressing recreational fields, supporting urban forestry projects, agricultural fertilizer programs, building and maintaining roadsides for long term release of nutrients, and site reclamation (due to its alkalization abilities).

"The agronomic qualities have shown dramatic improvements in tree growth for forestry production while still maintaining board strength. It can reduce the time from planting to tree harvest by half (nine years vs. 20 for some tree species)."

Finally, the process may also have some potential for processing source-separated organics (SSO).

Crane says the process can take SSO as a substrate to produce a biofuel with approximately 50 per cent the fuel value of coal. The process can also be used to help shorten the SSO composting process.

It's clear that lime or alkaline stabilization has some application and benefits, and represents another tool for keeping organic wastes out of landfill. ♻️

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