The case for recycling the stuff in your toilet

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A Vancouver-based clean technology start-up called Ostara Nutrient Recovery Technologies wants to turn what gets flushed down your toilet into fertilizer.

Why is this good? Well, obviously recycling anything — even the stuff in our poop — is a good thing. For me, the importance of turning waste water into fertilizer hit home after reading a year-old story, titled “Peak Phosphorus,” in the magazine *Foreign Policy*.

“Our dwindling supply of phosphorus, a primary component underlying the growth of global agricultural production, threatens to disrupt food security across the planet during the coming century,” it read. “This is the gravest natural resource shortage you’ve never heard of.”

Great, more doom and gloom to get depressed about. The good news is we can recycle phosphorus, partly by removing it from our waste water. And we have a lot of waste water.

Phosphorus is a somewhat rare mineral in the Earth’s crust. Yet humans and animals depend on it for healthy bone formation.

When the plants we eat grow, they soak up mainly phosphorus, nitrogen and potassium nutrients from the soil. Over time and with heavy growing, that soil can become depleted of such nutrients, which is why we rely on fertilizers to boost the productivity of crops.

The problem with phosphorus is that getting more of it has meant mining it from ancient seabed rock. Some studies suggest that North American reserves peaked in the late 1980s and will be depleted by 2035. Global reserves could start running out in about 50 years with production expected to peak within the next two decades. Meanwhile, the world population continues to grow.

“Irrespective of how much phosphorus is left, in order to get our hands on it is increasingly very energy intensive and environmentally harmful,” says Phillip Abrary, co-founder and chief executive of six-year-old Ostara.

Using technology licensed from the University of British Columbia, Ostara has figured out how to economically extract phosphorus, ammonia and magnesium from the sludgy liquids in municipal waste water. It then turns these nutrients into a pure, slow-release compound that can be used as and blended with commercial fertilizer products. It calls the pelletized compound Crystal Green.

The process is most efficient at removing phosphorus from the waste stream. As much as 85 per cent is extracted and recycled as fertilizer. At the same time, the process dramatically reduces the amount of phosphates and ammonia that makes it into our lakes.

Too much of these nutrients cause algae blooms and other plant growth in lakes that can kill fish.

Now, there are other ways to recycle phosphorus. Anaerobic digestion systems used on farms turn cow manure and restaurant grease into biogas, which is used to generate electricity or burned to supply heat. The by-product of this process is a phosphorus- and nitrogen-rich liquid that can be spread on nearby land to displace the use of commercial fertilizer products.

Abrary is all for this approach, but says it’s simply not practical on a large scale, such as at a municipal waste water treatment plant.

Some municipal plants, such as the one at Ashbridge’s Bay, dry their sludge and turn it into “biosolid” pellets that can be sold as low-grade fertilizer. But the risk that the pellets contain pathogens and heavy metals has kept this approach controversial.

Ostara’s edge is that it makes a pure, high-grade product that can be blended with commercial fertilizers. This means it has a large market to tap, unlike biosolids. And using Ostara’s approach, plants can still capture methane from their waste water stream and use it for power or heat production.

It’s part of the reason why Ostara has been attracting international attention, investors and customers. It has four commercial demonstration plants, including its first systems in Edmonton, and now has its eye on the European market.

“The traction is starting to happen,” says Abrary, adding that interest is also building in Canada. “There are a couple of fairly significant Canadian cities in the design phase right now. They’ve invested a lot of time and money to spec out our system.”

He wouldn’t say which cities, but the word Toronto never came up.

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