

THE GLOBE AND MAIL



A cheese maker at Laiterie Charlevoix brushes the rinds of ripening wheels of Hercule de Charlevoix.

Tad Seaborn for The Globe and Mail

Making 'green' cheese: an eco-friendly answer to a waste disposal challenge

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That wholesome wedge of cheddar you just put out on your cheese board spawns a waste disposal issue most of us never think about. I hadn't given the environmental impact of making cheese much thought – after all, much of what I eat is whole milk, traditionally made and hand-packaged. Then I took a tour of a Quebec *fromagerie* that's taking an innovative approach to the problem.

When milk is coagulated to make cheese, it separates into curds and whey. The curds go on to become cheese, and the remaining liquid, the whey, has to be disposed of – often in large quantities. Only 10 per cent of milk (the protein known as casein) turns into curds; 90 per cent is left as whey, which presents serious environmental concerns if it's simply dumped on the ground or into the water system.

And there's a lot to dump: Every kilogram of cheese generates about nine litres of whey. In 2010, Canada produced 414 million kilograms of cheese, generating more than 3.5 billion litres of whey.

Rich in carbon and minerals such as phosphorous and nitrogen, whey can throw off the natural equilibrium of the ecosystem. If released into a river, it can lead to oxygen deprivation in fish. (Whey disposal is regulated to ensure that its organic charge is reduced before it's dumped.) "It's okay to spread whey in certain quantities," says Marc Hubert, vice-president of Valbio Canada, a company that builds systems that convert organic waste into biogas, "but it has to be part of a bigger nutrient management plan."

In Ontario, large companies such as Kraft, Parmalat and Saputo generate the majority of whey. Jay Kirktown, vice-president of business development at Gay Lea, says that most of Ontario's whey is processed and turned into WPC (whey protein concentrate) or dried into whey powder (valuable for use in products such as sports drinks and sports bars). But for smaller cheese makers, investing in that solution isn't financially realistic.

"Feed it to the pigs," I hear all you whey-fed pork lovers shouting, and indeed that is one solution. Many cheese makers transport their whey to local hog farms where it is used as feed for animals (whey is nutritional because of its protein and lactose content). But this may not be a feasible long-term solution. For a cheese producer such as Laiterie Charlevoix in Quebec, which processes almost two million litres of milk a year, transporting the whey to local farms was becoming difficult and expensive. Robert Benoit, a spokesman for the dairy, explains that as more small and medium-sized pig farms in Quebec fold, "you have to transport the whey farther and farther away. This means a driver gone two to three hours each day, extra diesel costs [4,000 litres a year], inspections and repairs on trucks. It was getting expensive."

In 2010, Laiterie Charlevoix, partly funded by the Province of Quebec, teamed up with Valbio Canada to create an innovative solution. Valbio installed a system that uses anaerobic digestion (the breakdown of organic matter in absence of oxygen) to create methane-rich biogas from leftover whey and wash water (water used to clean the cheese plant). The biogas is used as energy at the dairy and heats two 25,000-litre tanks of hot water that is then used to pasteurize the milk. Since the system became fully functional, Laiterie Charlevoix has been able to eliminate the consumption of 65,000 litres of oil a year.

Once the methane is extracted, the resulting effluence (a dirty-looking sludge) still needs to be "polished" before being disposed of. In many cases it goes through a septic system or is fed into the local sewer system.

But Laiterie Charlevoix did something unique within the cheese industry. It combined the biogas system with a large greenhouse where plants, which eat organic matter, are used to help further cleanse the effluence (the concept is called phytotechnology). The resulting purified water runs off into the surrounding land and eventually into the local salmon stream. I was shown "proof of life" in a small man-made goldfish pond that resides within the facility and is filled with the refined water.

Although transforming organic waste into biogas is not a new concept, the usage in cheese plants is more recent. "There should be enough energy from whey and waste water to meet all their thermal needs," Valbio's Mr. Hubert says. "And when you produce energy from effluence, it's not like a fossil fuel that runs out - it's constant."

Green cheese may just be a good thing after all.

Sue Riedl blogs about cheese and other edibles at cheeseandtoast.com.

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