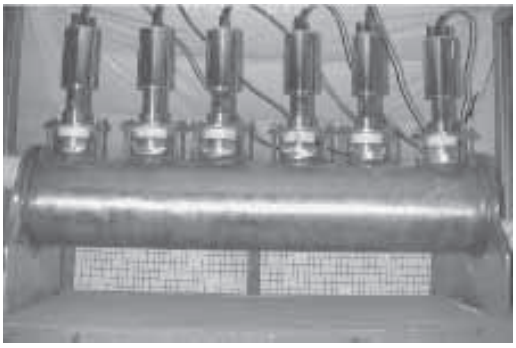
They're Using Sound Waves To Kill The Smell Of Manure



To kill odors, liquid manure is subjected to intense sound waves using titanium probes. The probes vibrate at 20,000 times per second, creating sound waves that literally shake apart molecules in the manure.

The long wait may be over for livestock producers who have been looking for an affordable manure treatment process that would leave manure storage facilities as odor-free as city sewage treatment plants.

A process developed by University of Iowa biochemist David Soll might be the answer. He subjects liquid manure to intense sound waves using titanium probes. The probes vibrate at 20,000 times per second, creating sound waves at the ultrasound level which are too high to be heard by the human ear. The rapid vibration literally shakes apart the molecules in the liquid manure. As this happens, there's a tiny implosion, releasing a miniscule amount of heat that causes a pressure build up at the molecular level.

This creates a chemical reaction that produces hydrogen peroxide and other powerful oxidizers. As these oxidizers are released, they tie up the ammonia and hydrogen sulfide in the manure, which are the main cause of manure odor.

What's more, the solids in the manure that pass through the treatment chamber are pulverized so they become suspended in the liquid and do not settle out in storage.

Major funding for Soll's research came from Heartland Pork Enterprises, Iowa Falls, Iowa. The large hog producer pitched in after officials there learned the effect Soll's process had on waste materials. As a result, while the University of Iowa owns the patent for the process, it will be licensed to a technology division of Heartland Technology, Alden, Iowa.

Kent Krause, a spokesman for the company, says they are in the process of developing and testing farm-size Sonicators, as the treatment chamber is called. They've had one system in place on a 1,350-head finishing building for six months.

Because the procedure is so simple and requires no chemicals or aeration, Heartland officials expect it to have applications beyond agriculture such as at sewage treatment plants. Because it's still in the developmental stage, the price is still a big unknown. However, Krause says it will be affordable, even when pork prices are as low as they've been this fall.

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On-Farm Waste Treatment Plant

Hog manure is too valuable a resource to ignore, despite its tremendous odor problems, believes Dr. G. Lakshman, president of System Ecotechnologies Inc., Saskatoon, Saskatchewan.

So Kakshman and his company have devised a two-stage chemical treatment process that works like a city sewage plant. It can be adapted to any size hog operation. He built a test version of the plant that treats the daily waste production from a 300-sow farrow-to finish operation in about 8 hours. And he has mounted the compact equipment on a trailer that he tows from farm to farm.

Basically, the process bubbles off the ammonia and then separates the solids from the liquid before further purifying the remaining water. The solids and ammonia can be used to fertilize crops, while the purified water can be reused in the operation for cleaning or misting hogs in hot weather. The process removes all bacteria, including E. coli.

"It eliminates the production of all greenhouse gases," he says. "This means the hog operator can create an additional revenue stream by accumulating carbon tax credits that can be sold in the international market."

The completely self-contained waste treatment plant consists of a series of interconnected polyethylene treatment tanks, chemical storage tanks, and pumps and valves to move waste and meter chemicals. All the equipment is off-the-shelf and pumps require only 110-volt electricity.

The system can be designed to fit the site where it will be set up. He says it can be totally automated, to the point that a worker only needs to flip a switch to turn it on or off.

He estimates the cost of processing manure through his processing plant is about half a cent per gallon in U.S. dollars. "That's similar to costs of using earthen storage systems that this would replace," he says.

He says costs could be reduced by processing only for odor control, leaving the ammonia in the wastewater. Dried solids from the processor are odorless, powder-like in consistency and rich in nutrients.

Lakshman received financial help to develop the process from the Manitoba Livestock Manure Management Initiative, Saskatchewan Agriculture and Food, the National Research Council's IRAP program and the Western Diversification Fund among others.

Lakshman and his company will provide a turnkey operation to producers, along with consulting and monitoring services and the chemicals to keep it operating. He's also looking at modifying the technology for dairy and beef operations.

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Freezer "Pump House" Keeps Water System Running

"It's a cost-efficient way to keep water flowing to our cows all year long," says Gordon Kozroski, Gull Lake, Sask., who uses an old chest-type freezer as a "pump house" to keep his water pump from freezing.

An electric pump bolts to a piece of plywood that simply sets inside the freezer. The pump pulls water from a pond 100 ft. away and pumps it to a 6-ft. long Ritchie stock waterer.

Kozroski got the freezer free from a local appliance repair shop. He removed the compressor and lag bolted the freezer to a cement pad. He cut holes in the side and bottom for water pipe. Water is pulled through a 1 1/2-in. dia. PVC pipe that runs underground to the pond. Foam insulation seals the holes around the pipes.

The pump plugs into an electrical outlet that Kozroski installed inside the freezer. Heat tape covers the input and output hoses to keep the water from freezing. Kozroski also wraps excess tape around the pump. The thermostat for the heat tape should be outside the freezer, away from the insulated components.

"It's well-insulated, weatherproof, and should last a long time," says Kozroski. "We used it last winter for the first time. The water didn't freeze up even when the temperature got down to 30 degrees below zero."

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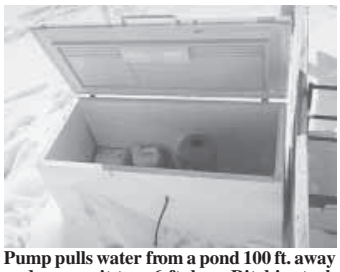

Pump pulls water from a pond 100 ft. away and pumps it to a 6-ft. long Ritchie stock waterer.

Charles Hoyt uses this trailer-mounted pump to pull water out of a nearby pond.

"Poor Man's" Portable Water Pump

After seeding a large area of grass and planting 1,100 new trees and bushes, Charles Hoyt, Medina, Ohio, needed a lot of water to keep everything alive.

Instead of lugging a pump around behind, he put together a "poor man's" portable pump that mounts on a 2-wheel trailer. He uses it to pull water out of a nearby pond.

He built a 2-wheel trailer with an offset axle, then mounted a 2 hp gas engine on front and a water pump off a GM 350 cu. in. car engine on back. The engine shaft-drives the pump by means of a shaft off an old Weed Eater trimmer.

He uses his garden tractor to back the trailer up to the pond and pulls on a rod attached to a spring-loaded ratchet to lower the offset axle until the pump is submerged in the water.

He pumps the water to a set of four lawn sprinklers. "I use a volume pump, not a pressure pump. But because it's all dead ending, and heading off at each sprinkler which restricts the flow, it creates enough pressure to run four sprinklers at a time..

"I used an old circular saw blade to make the ratchet that's used to adjust the height of the pump. I mounted the saw blade on the offset axle and welded a short length of steel pipe to the side of it. To lower the axle, I just stick the rod inside the pipe and lift upward, which takes tension off the blade and allows the axle to pivot down."

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