

Cow Power: System Could Let Cows Produce Milk AND Electricity

Contented cows may be giving more than milk these days. Their manure could help to turn the lights on at farms, thanks to a project being undertaken by the Texas Water Resources Institute and Texas Cooperative Extension.

The Institute received a grant from the Natural Resources Conservation Service to test an on-farm manure-to-energy conversion system for future use on Central Texas dairies.

Dr. Saqib Mukhtar, Extension agricultural engineer and one of the project leaders. "We're trying to find out if we can benefit the environment by diverting some of the manure that is being applied to waste application fields."

The grant is funding the assembly and testing of a portable energy generation unit that's otherwise known as a thermophilic digester and fluidized bed gasifier system. Because the unit will be on skids, it can be taken from farm to farm for educational demonstrations.

"We're trying to find ways to divert excess manure and reduce repeated and excessive application of phosphorus to waste application fields that can potentially become a non-point source of pollution," Mukhtar said.

Repeated applications of manure results in soil levels of phosphorus exceeding quantities needed for plant growth, he said. That excess phosphorus can wash into creeks, rivers and lakes, causing additional problems with excess algal blooms and decreased oxygen in the water.

"Some farmers have contracts with commercial composting outfits," he said. "These composters pick up manure that is scraped from corrals and piled on site. Composted manure is used by home gardeners and commercial nurseries. Some of it is used for fertilizing rights-of-ways by the Texas Department of Transportation.

"Dairies are trying their best to comply with all the rules," he added. "(But) if you apply manure at more than agronomic rates to land again and again, you still face environmental problems."

If the environmental problems aren't solved, he said, "You either shut down the dairies or drive them out of a region that's heavily dependent on the industry."

The portable unit will have an anaerobic digester to produce methane and carbon dioxide, Mukhtar said.

"Liquid manure will be treated with naturally occurring bacteria," he said. "The resulting biogas (mostly methane and carbon dioxide), which is produced from anaerobic digestion, will be used as a source of energy. That reduces its natural emission, which has a much greater global warming potential than carbon dioxide."

The second part of the system is a gasifier, a piece of equipment that partially heats the biomass but does not burn it, he said. It is used to gasify fossil fuel or biomass including manure. Gassification is a process by which carbonaceous fuel (any fossil or biomass fuel consisting of or containing carbon) is converted to a usable gaseous product without complete combustion of the fuel, he said.

Also, it can replace natural gas in a gas turbine, Mukhtar said.

"Our idea is to generate methane gas (with the anaerobic digester) and then use that energy to dry the separated solids from the manure (with the gasifier)," he said.

These dried, separated solids can be used as feedstock to generate energy that could be used to produce electricity for a farmer's home, barn or irrigation pump. The energy production from the system could be about as high as 11 million Btu per day, he said, or a fuel equivalent of 75 gallons of diesel or 116 gallons of propane.

Studies are also under way to convert manure to generate energy in coal powered plants, he said. But manure, when excreted, can be up to 90 percent water and is heavy.

The transportation costs due to its weight make it cost-prohibitive, he said. That's what makes the prospect of generating on-farm electricity so attractive, and the unit could be expanded to generate even more electricity.

Mukhtar hopes to begin demonstrating the unit once it is assembled and tested and funding becomes available.

About the Author

From agnews.tamu.edu:

Digestion information covering the digestion system and related diseases, procedures and tests, medications, and treatments. Produced.

Marshfield agricultural research center studies cow digestion Researchers observe the digestibility of cattle feeds by replicating.

In contrast, increased forage particle size in dairy cow diets improved fiber digestion and microbial protein synthesis in the rumen, and shifted.

The feeding program for a cow, affects digestion. For example, high fiber forages are less digestible. Since, undigested food can not pass out of the rumen.

In a cow, however, the abomasum starts digestion of the feed which has been partially degraded by microorganisms. These bacteria and protozoa.

We studied the effects of goat and cow milk fat on the digestive utilization. of this nutrient and on some of the biochemical parameters that are related.

In this thesis the possibilities for digestion of cow and pig manure are. Anaerobic digestion of cow manure. Optimization of the digestion.

Source: <http://www.products herbal.com>