

Methane gas made from animal manure

By MARTHA HOLLIDA
The energy shortage and the concern for management of livestock wastes has created an interest in methane gas production from livestock manures.

"It is completely a biological process," said Dr. Donald Reddell, Texas A&M professor of agriculture engineering, specializing in animal waste management.

Converting animal wastes to methane gas involves two groups of bacteria present in the waste. The first group breaks down waste compounds into soluble fatty acids. The other group of bacteria (which are aerobic or work without oxygen) convert the fatty acids into methane gas and carbon dioxide.

Anerobic digestion has been used for a number of years in sewage treatment, but has only been used since the 1960s for treatment of animal manure.

"In the early 1970s people began looking into animal waste products as an energy source," said Richard Egg, graduate student and research assistant.

The major uses of methane gas are for space heating and generating electricity. On farms it can be used for crop drying, irrigation and operation of feedmills.

"A lot of lab studies have been conducted with one-and two-gallon waste digestors to establish operating conditions and performances of different types of manures," Egg said.

All types of livestock wastes can be processed into methane gas. It takes the waste of four dairy cattle to produce the equivalent of one gallon of gasoline. Poultry waste can be converted the most efficiently, followed by that of dairy cattle, swine and beef cattle.

Research into the gas conversion process is being conducted by the U.S. Department of Agriculture, various universities, extension offices and cattle organizations.

Texas A&M has been involved in methane gas production for a year and a half.

A digester is set up at the College of Veterinary Medicine that is capable of producing 30 cubic feet of gas a day, Reddell said. He added that the gas was 50 to 60 percent methane and the rest carbon dioxide.

The manure is put in a pre-mixing tank and water is added to dilute it to 5 to 7 percent solids. The sludge, as it is called, is then blended and pumped into the digester, a 900-gallon fiberglass tank. The sludge is then heated by hot water, that runs through coils below the digester. A line removes the gas.

"It is a sensitive process," Egg said. "The environment for the bacteria is maintained best at 95 or 120 degrees Fahrenheit for maximum production. He added that the waste stays in the digester for 15 days, but some is added and taken out daily.

The digester was in operation at the vet school for four months last summer but was shut down to make some mechanical changes and to evaluate production results.

"During the summer we let the gas exhaust into the air after measuring its contents, but in the future we hope to use the gas to incinerate the dead animals at the vet clinic," Egg said.

Waste left in the digester can be used as fertilizer.

"It can explode, it's just like any other gas," Reddell said. "We use all fiberglass and plastic equipment as a safety precaution and we have the digester buried."

What about the economic outlook for the small farmer or rancher interested such an operation? Reddell said that the capital costs were high and storing methane gas is difficult and expensive.

"The digester has to run constantly to be at peak production and the individual has to either have a constant use for the gas or an elaborate storage facility," he said.

Egg said, "For a plant capable of converting the wastes from 100 head of dairy cattle it can cost between \$35,000 and \$75,000. It just depends on the individual and a lot of variables."

The University of Missouri has an operation that is capable of converting gas from the wastes of 5,000 to 10,000 head of hogs. The school has a storage system and uses the gas for heating purposes on the Missouri campus.

"There is a privately-owned plant in Florida that can handle the wastes from 15,000 head of beef cattle," Reddell said. "The gas is used for steam flaking their cattle feed and other management operations. The remainder is sold to a town as heating gas."

A plant was recently opened by Thermonetics, Inc. in Oklahoma that is designed to convert the wastes of 100,000 head of feedlot cattle into gas. It's then put directly on an interstate pipeline, which supplies natural gas to Chicago.

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Campus Names

Keese gets award from space institute

First place in an American Institute of Aeronautics and Astronautics student paper competition has gone to Texas A&M student David L. Keese.

A certificate and bronze medal were presented him at the AIAA national meeting recently in Washington, D.C.

Keese's paper, "Zero Pressure Balloon Design," was chosen in the undergraduate division. Now

an Exxon production engineer at Midland, Keese becomes eligible to attend the 29th International Astronautical Federation Congress in Yugoslavia this year. He graduated from Texas A&M last May.

An aerospace engineering major, Keese did the work for his award-winning paper in the Undergraduate Fellows Program. He earlier was one of seven regional winners across the nation.

Dr. James L. Rand of the aerospace engineering faculty was Keese's faculty advisor.

10 cadets receive

'Distinguished' status

Distinguished Military Student status has been announced for 10 additional Texas A&M seniors in the Army ROTC program.

DMS is a prerequisite to a Regular Army commission upon graduation according to Col. James R. Woodall, professor of military science. He announced the honorees.

They are chosen on the basis of military science and academic

class standing, summer camp performance and contribution to the Corps of Cadets.

The new Distinguished Military Students are Joseph C. Butler of Houston; Richard L. Chastain, Killeen; Thomas M. Dreier, College Station; Charles L. Greco, San Antonio; Kent R. McEmore, Jasper.

Also, Kevin F. Patterson and William B. Stone III, Colorado Springs, Colo.; William Y. Porter, Waco; Robert M. Stone Jr., Seabrook, and Lee R. Wallace, Temple.

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