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Editor-in-chief Loris Racine
Editor Wayne Campbell
Executive Editor Joan Powers Rickerd
Editor French Texts Michel Brochu
Editorial Production Coordinator Patricia Montreuil
Photography Bruce Kane
Coordinator, Design & Print Robert Rickerd
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Pig power

In the near future, pig farmers may take advantage of an NRC development to eliminate unpleasant manure smells and at the same time offset their energy needs.

At NRC's Rideau Falls Food Technology Laboratory, anaerobic bacteria are busily digesting their way through a daily diet of pig manure. This kind of microbial digestion of waste material is a simple process, producing energy in the form of methane with the added benefit of cleaning up bothersome wastes. Pig manure was chosen as an example of a farm waste now becoming an environmental problem because of the large increases in hog population.

The advantage of the NRC-developed digester is in its retention of methane-producing bacteria from one manure batch to the next. The bacteria adhere to the surface of a film inside the digester, process the manure into acids which ultimately are turned into methane and carbon dioxide, and remain there when the digested manure is removed. By retaining the slow-growing methanogenic bacteria, (see *Science Dimension*, 1979 #3) NRC researchers are now able to replace the total volume of their 35 L digester in one day, thereby enhancing its methane-producing capabilities. Previously, the loss of bacteria meant that only a fraction of the total digester volume could be replaced daily. But the system has a trade-off. While there is a greater production of methane in reduced time, the per cent conversion of waste into biogas is lower than in the longer process.

Ultimately, it will be the farmer's requirements that determine how the system is used. If there is a steady daily need for methane, then the shorter re-

tention will be more advantageous. However, energy consumption on a farm is not often very high, especially in the summertime. While an average-sized pig farm in Quebec (2,000 hogs) could produce more methane than needed to heat the barn, house and perhaps even cook the meals through the winter, more uses could be found for the gas on the farm site, perhaps to run a generator to produce electricity. Alternatively, the gas could be shared with neighbors. At present, excess methane just isn't valuable enough to transport over long distances, but if costs should increase significantly, the additional equipment for purification and the needed transmission pumping stations might make larger scale transportation economical.

As for the material remaining after digestion, it will go back to the land (it is a slightly better fertilizer, containing more ammonia nitrogen) or it can be recycled as animal feed.

Two proposals for use of the NRC system are now under review and they could result in an operational farm-scale digester in Quebec and Ontario by 1982. This development is in close cooperation with Agriculture Canada. The need for such waste treatment was underscored by Quebec's Ministry of the Environment last June when it announced a three-year ban on new industrial pig farms in the areas of the Assomption, Chaudière and Yamaska rivers, because of heavy pollution of the waters by pig manure. □

Patricia Montreuil

NRC's David Cameron and Bert van den Berg examine the 35 L manure digester.

David Cameron et Bert van den Berg, du CNRC, examinent le digesteur.

