DOE Funds Study To Increase Value Of Manure

RICHLAND, Washington — It is hard to think of animal manure as a valuable commodity. But with 160 million tons of it produced annually in the U.S., and most of it rich in carbohydrates and proteins, researchers at the Department of Energy's Pacific Northwest National Laboratory (PNNL) and Washington State University (WSU) see potential in converting substantial portions of it to commodity chemicals and other high-value products.

PNNL and WSU are beginning a two-year study to determine the best processes to generate higher-value products from manure. The study is being funded by an $800,000 grant through DOE's Office of Energy Efficiency and Renewable Energy and is focused on developing new processes to use animal manure as feedstock for commodity chemical production.

The team will use the carbohydrate- and protein-based chemical building blocks from manure to produce a range of products. The carbohydrate material, composed of five- and six-carbon sugars, will be converted to commodity chemicals, such as glycols or diols, commonly used to manufacture antifreeze or certain plastics. The protein components will be converted to animal feed and other higher-value products.

PNNL has developed innovative catalytic approaches for converting other low-value biobased materials to chemicals, such as the wastes and by-products resulting from processing corn, wheat, potatoes and dairy products. Researchers at PNNL separate the carbohydrates and oils from low-value feedstocks. The carbohydrate fraction then is catalytically converted to higher-value products. This approach will be applied to manure, described as a messier resource by Don Stevens, project manager for the PNNL work.

"While some biomass feedstocks, such as wheat wastes, are made up mostly of clean carbohydrates, manure is messier with only about half of it consisting of carbohydrates. Additionally, manure contains a much higher protein percentage and a greater mix of minerals," said Stevens. "The production of chemicals is therefore more complex and the processes must include more extensive separations of these components to be useful for chemical production."

PNNL is teaming with WSU researchers because of their extensive experience in separations chemistry and in recovery of high-value protein products. WSU is a land grant university and operates a dairy and feedlot in Pullman, Wash.

The payoff could be huge — environmentally and economically. "Animal waste is increasingly difficult to dispose of. With fewer, but larger, animal operations across the U.S., the waste is more geographically concentrated, resulting in more environmental problems," Stevens said.

"By successfully converting the wastes into chemicals, we can greatly reduce the need for open-field disposal of manure, which will reduce odor problems, methane emission to the atmosphere and run-off of contaminants into streams and lakes."

Another payoff is reducing the number of petroleum-based products on the market. Currently, almost all the medium-volume commodity chemicals, such as those used to make antifreeze, carpet fibers and soda pop bottles, are petroleum-derived. Stevens said it's conceivable that in a few years biobased products could directly replace some chemicals currently made from petroleum resources.

They also could be cheaper to produce. Stevens said the kinds of chemicals the team is focusing on are potentially more efficient to produce from biomass feedstocks than petroleum, and that the total energy required for their production is roughly half when compared to the same chemical from petroleum.

Business inquiries on this or other PNNL technologies should be directed to 1-888-375-PNNL or e-mail: inquiry@pnl.gov.

Pacific Northwest National Laboratory is a DOE research facility and delivers breakthrough science and technology in the areas of environment, energy, health, fundamental science and national security. Battelle, based in Columbus, Ohio, has operated the laboratory for DOE since 1965.

New York Farm Bureau Urges Lawmakers To Restrict Dairy Imports

GLENMONT, N.Y. — New York Farm Bureau President John Lincoln is urging New York's congressional delegation to help stem the tide of foreign subsidized and "fuzzily labeled" dairy products.

At issue is a new technology producing a new product — milk protein concentrates (MPCs) that are unregulated by trade treaty. The mislabeling of product-blends by exporters as simply MPCs is an additional concern.

American companies import these foreign-subsidized proteins to make pizza cheese, desserts, weight-loss drinks, and "power bars," displacing American milk in the process.

There has long been a quota on importation of non-fat dry milk powder to keep foreign countries from dumping excess and subsidized milk on the U.S. market. "Over the past six years, foreign exporters have cleverly found a new way to circumvent the existing rules," said Lincoln, a dairy farmer from Bloomfield, N.Y. "They found they could get around the rules by blending the powder with MPCs and casein (another milk protein) and still call it milk protein concentrate."

There is no import quota on either casein or milk protein concentrates.

New York congressional representatives John McHugh and Maurice Hinchey have introduced legislation in the House of Representatives to address this unfair trading practice for New York's dairy farm families. It would create two new tariff-rate quotas — one for milk protein concentrates and one for casein. The legislation also has a companion bill in the U.S. Senate.

Blending the restricted non-fat dry milk powder with these unrestricted protein imports lets manufacturers use less domestically-produced powder, which hurts the long term outlook for U.S. dairy farm prices, said Lincoln.

Legislation introduced by representatives McHugh and Hinchey — House of Representatives bill 1786 and Senate bill 847 — is particularly important in light of the Department of Agriculture's recent decision to realign the already low support price for non-fat dry milk powder, said Lincoln. "Since the support price for non-fat dry milk powder has been cut by 10 cents, it is crucial to dairy-farmer prices that we eliminate unfair competition from foreign countries."

Lincoln urges dairy farmers to contact their congressional representatives to express their support of this important legislation.