

More Proactive Approach Needed

(Continued from Page A36)

anything mutagenic being spread on fields. But mutagens, said Furanic, are present everywhere—in garden vegetables, coffee, and beer. In fact, nine mutagens have been identified in fried hamburger.

"Coffee, hamburger have mutagens in them," he said. "It's just a matter of dose." Baker noted that mutagens "can interact with DNA—any DNA, from bacterium to human DNA," she said. The question remains: how to they go about at what doses to produce cancer in humans?

In the responses, Don Robinson, Lancaster County Conservation District manager, asked if the results can be transferred to the field under climatic conditions, and how the high pH of 12 will affect the nutrient capability of the soil.

How would the high pH impact soil if the grower is managing nitrogen and other nutrients to produce 150 bushels per acre of corn? The high pH of the sludge will increase soil pH. That's why "you can't have heavy application rates," noted one application expert. But effects on soil biological activity need to be assessed in the field.

As a result, Baker noted that the next stage of research should involve testing the lime-treated sludge on a variety of soil and rainfall situations. A more "proactive" approach can provide the way to address public concerns, simply by the wastewater plants performing reliable bioassays on the material before applying it to farm fields—to assure the safety of the product.

Baker noted that, whether it is dead leaves going on the soil or human refuse, there will be "carcinogens" present.

Robinson said that the "proactive approach" is the right thing to do. However, the questions of using that much lime and placing it on the fields could pose concerns to the farmer.

Dee Walter, HACC adjunct faculty, biology, also was pleased with the proactive approach and the cooperation of industry and landowners to getting rid of sludge "in a safe and effective manner." But more research into the use of biological assays is necessary. The willingness of the wastewater industry and researchers to address

the public safety concern "is a step in the right direction," she said.

Jay R. Snyder, Borough of Ephrata environmental resource manager, also applauded the proactive stance. "I am the one challenged with taking it out to the field," he said. "The last thing I want to do is pollute the land of friends and neighbors."

But the public should also concern themselves with looking at materials that make "our own body healthier to fight off mutations," he said, including a healthy diet that contains antimutagenic and anticarcinogen materials, such as green, leafy vegetables. "We live in a harsh environment," said Snyder.

C. D. Vu, engineer with the Pennsylvania Department of Environmental Protection (DEP), noted there were positive implications of the research done. But more work is needed to determine the differences of what happens in laboratories compared to the field.

The results of the tests will be published in Water Environment Federation.

The next step, noted Baker of Penn State, is to work with cooperating municipalities and DEP to set up in-field testing of how land-applied sludge effects overall soil health and more work into curbing mutagenicity of biosolids. It's where the "research has to go," she said.



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