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Scientists clean toxic water

By ANDREW THAGARD

News Writer

Researchers from the University's Center for Environmental Science and Technology have discovered a method of cleaning up water contaminated with toxic metals using biomass from South Bend's ethanol plant and ground Indiana corn cobs.

The research team, including Notre Dame professors Charles Kulpa and Clive Neal, assistant professional specialist Jinesh Jain, professor Mark Schneegurt of Wichita State University and four Notre Dame undergraduates, hopes to present the idea to mining companies in the future.

"The question was 'could we take out heavy metals from water?'" Kulpa said. "There are methods but they're expensive so we thought about [using] biomass. The idea came from us sitting around and trying to solve a problem."

The team conducted experi-

ments with simulated mine wastewater using ground corncobs and the by-product from ethanol production. The result, according to Jain, removed toxic metals from water and transferred it to the biomass leaving the cleaned water and a degradable sludge.

Along with simulated wastewater, the team also tested their cleanup method on water samples from Berkley Pit in Butte, Mont. The analysis were successful at removing toxic metals from the five gallons of water tested.

"We had very good success," Jain said. "We were able to remove lead. We had a problem with arsenic."

The biomass also removed cadmium, nickel and zinc from the wastewater.

The team chose to use the biomass because they knew that it would bind to the metal and remove it from the water. The group is also studying ways of harvesting the metal from the by-product for commercial use, a process that could be carried out by combustion or composting the mass, according to Neal and Kulpa.

"All we've done right now is demonstrated its feasibility," Neal said. "The next step is to demonstrate its application."

"This project has the potential to help industry in detoxification," Jain added.

The research was funded by the Center for Environmental Science and Technology but

the team has already been approached by a Notre Dame alumnus who owns a copper mine and is interested in using the method for cleanup.

Kulpa, Neal and Jain worked on the project with Mark Schneegurt and four Notre Dame undergraduate students including Sara Brown, Matthew Quallick, John Menicucci and David Garofalo. At the time of the research, Schneegurt was at Notre Dame working on post-doctorial work. He has since taken a post at Wichita State as an assistant professor of biology.

The four undergraduate students, who have since graduated Notre Dame, were important in carrying out the research, according to Kulpa, Neal and Jain.

"They actually ran a lot of experiments," Kulpa said. "They did a lot of the column work and assisted in analysis. It was very much undergraduate driven work."

The three main researchers, Kulpa, Neal and Jain, are members of Notre Dame's faculty. Kulpa is a professor of biological sciences and director of the Center for Environmental Science and Technology. Neal is an associate professor of geological sciences and director of the ICP-MS facility and Jain is an assistant professional specialist.

Contact Andrew Thagard at thagard.1@nd.edu.