

Yellowstone Microbe Cleans Up Wastewater

Scientists have discovered a microbe in Yellowstone National Park that could be used to clean up wastewater, providing an economical and natural way for paper and clothes manufacturers to treat water before releasing it back into rivers and streams.



The hot spring in Yellowstone National Park where scientists found the microbe.
Image courtesy INEEL.

The microbe itself would not be used in the cleanup. Instead, scientists extract a protein from the microbe and add it directly to industrial wastewater. The protein breaks down hydrogen peroxide, which is often used to bleach clothes and paper before they're dyed or to sterilize paper food packages such as juice boxes.

The Yellowstone protein is impressive. It works 80,000 times longer than what's currently used to clean up hydrogen peroxide, although the researchers point out that it has only been tested in the laboratory and not on a large-scale. They are in talks with commercial manufacturers about scaling up the process, but it's unclear when this might happen.

"It's amazingly better than what's out there now," says Vicki Thompson of Idaho National Engineering and Environmental Laboratory in Idaho Falls, who led the research. She and her colleagues accidentally stumbled across the microbe in samples they had collected from a Yellowstone hot spring on an expedition to find microbes that would help in processing sugar beats. Instead of sugar beat solutions, they found a microbe that

breaks down hydrogen peroxide at high temperature and pH. The microbe is called *Thermus brockianus*.

It wasn't immediately clear what application it could have until they heard about hydrogen peroxide problems in the textile industry.

A technology industry magazine called R&D Magazine recently featured the discovery as one of the 100 most significant achievements of the year. Thompson says she suspects the editors liked the fact that the research involved microbes that live in extreme conditions in Yellowstone.

"Because of our proximity to the park, Yellowstone is a natural place for us to go look for things," says Thomson.

She and her colleagues found the microbe in a hot spring just north of Old Faithful that goes by the name LNN2 (for Lower geyser basin No Name 2).

To extract the protein, researchers grow large amounts of the microbe and then break them apart to retrieve the protein. They purify the protein and then add it directly to the wastewater in a liquid form.

They can also attach the protein to small beads, which can be filtered out of the wastewater so that the protein can be used over and over again.