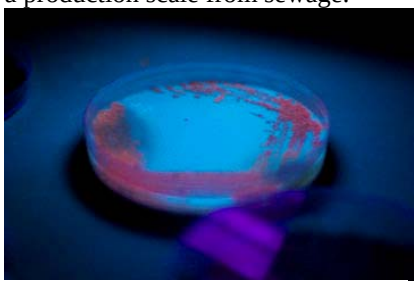
PLASTICS FROM WASTEWATER
GROWING AMERICA'S GREEN ECONOMY WITH RESEARCH AND INNOVATION

2008 EPA P3 Award Winner

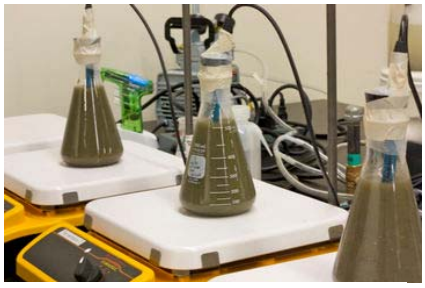
They say you are what you eat, but soon the container you are drinking from might be made from what you digested! Just as we can produce fuels from bio-waste, a team of students hopes to produce plastics on a production scale from sewage.



The team from University of California Davis was a winner of EPA's P3 Award for a laboratory scale version of this process. The process not only uses wastes for raw materials, but also will decrease the amount of waste that needs to be treated and disposed.

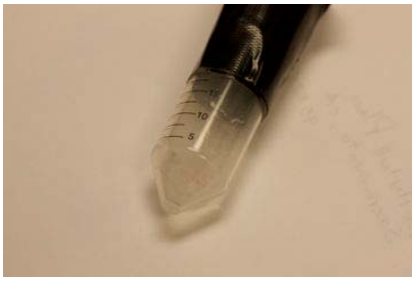
Their initial goal was to figure out if a Polyhydroxyalkanoate (called PHAs and PHBs) production process could be integrated into a specific Waste Water Treatment Plant (WWTP). UC Davis did this by running a number of bench-top reactions on site specific waste and creating a pilot plant design. The team is well on their way to meeting their P3 Phase 2 goals which are to operate a pilot-scale process at an existing wastewater treatment plant, develop operational criteria for a full-scale system; secure patents and commercialize the technology.

The team recently started their own company called Micromidas which will use bugs (microbes) to digest the sewage sludge into plastic. The company located in West Sacramento, currently employs 10 full-time workers and six interns. Their main task is to screen for productive microbes that will make a lot of plastic under certain conditions. "We take millions (of) bacteria out of a pond," Micromidas CEO John Bissell said. "There are certain characteristics that bacteria have to have to be PHA-producing bacteria. We apply selective conditioning so only those bacteria can survive." Currently they can create a kilo of PHA in five to six days with an "unfinalized" microbe mix.



Bissell claims that their plastic is non-toxic and unlike petroleum-based plastics that can take many centuries to degrade, PHA-based plastics are completely biodegradable in land and water. Micromidas also states that objects manufactured out of PHA are also biocompatible, gradually breaking down harmlessly within the body causing no damage or inflammation. This feature could open up a wide range of industrial applications, such as medical sutures, tissue repair devices, and other biomedical uses.

PHA based plastic has superior physical characteristics over most bioplastics produced today from Polylactic acid or PLA. One of those characteristics is a higher melting point. PHA is sold in pellets and can produce anything that can fit into a thermal injection mold. Micromidas is currently discussing their product with companies like Johnson and Johnson, Pepsi and Nestlé. Bissell says their microbe formula is ready for scale up towards commercial production.



Total EPA Investment

$85,000

Return on EPA Investment

Company established that currently employs 10 employees and 6 interns. Company growth rate in Jan 2010 is exponential: staff is doubling every 4 months.

OTHER AWARDS:
Cleantech Open Award

OTHER LINKS:
EPA Project reports:
http://www.epa.gov/ncer/plastic
Micromidas:
http://www.micromidas.com
EPA P3 site:
http://www.epa.gov/P3

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