

Researchers tap yeasts as source of 'green' surfactants

July 28 2011

Surfactants, which are wetting agents that lower a liquid's surface tension, have a long list of uses, from detergents and cosmetics to paints and pesticides. Most surfactants are petroleum-based. But in Peoria, Ill., a team of U.S. Department of Agriculture (USDA) scientists has focused their attention on sophorolipids, surfactant-like molecules produced by naturally occurring yeasts.

Microbiologist Cletus Kurtzman is spearheading the studies at the National Center for Agricultural Utilization Research (NCAUR), operated in Peoria by the Agricultural Research Service (ARS), USDA's chief intramural scientific research agency.

Using phylogenetic analysis and mass-spectrometry, Kurtzman's team screened 19 of the 40 known members of the *Starmerella* [yeast](#) family for their ability to produce the sophorolipids.

Phylogenetics, which traces the [evolutionary relationships](#) between species or groups, was particularly useful because it enabled the team to determine which *Starmerella* members produce the molecules based on shared [gene sequences](#) for the trait. For example, only a few *Candida* [yeast species](#) had previously been shown to make the sophorolipids-most notably, *C. bombicola* and *C. apicola*.

Kurtzman's team was able to broaden its search by tapping the ARS (microbial) Culture Collection, maintained at the Peoria center's Bacterial [Foodborne Pathogens](#) and Mycology Research Unit.

In studies there, the researchers cultured the yeasts on a diet of glucose oleic acid. They then measured the yeasts' sophorolipid production levels over a 24- to 168-hour period using mass-spectrometry analysis, which can identify compounds based on their unique molecular weights.

As expected, *C. bombicola* and *C. apicola* boasted the highest sophorolipid yields. They weren't the only ones, though: The team's analysis also turned up three other high-producing yeasts, including a new *Candida* species.

According to Kurtzman, the findings add to a short list of candidate yeasts with potential use in fermentation-based methods of mass-producing the sophorolipids as green alternatives to petroleum-derived surfactants.

He and ARS team members Neil Price, Karen Ray and the late Tsung-Min Kuo reported their work in *FEMS Microbiology Letters*.

Provided by United States Department of Agriculture - Research, Education and Economics

Citation: Researchers tap yeasts as source of 'green' surfactants (2011, July 28) retrieved 23 April 2024 from <https://phys.org/news/2011-07-yeasts-source-green-surfactants.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.