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Can Engineered Bugs Help Generate Biofuels?

The versatile organism Lactococcus lactis, the workhorse bacterium that helps turn milk into cheese, may also be valuable in the understanding of how microbes turn the organic compound cellulose into biofuels.

New research from Concordia University, published in the journal *Microbial Cell Factories*, suggests the bacterium can be engineered to transform plant material into biofuels or other chemicals.

Concordia biology professor Vincent Martin and his PhD student Andrew Wieczorek demonstrated how structural or scaffolding proteins on the surface of the bacteria can be engineered in *Lactococcus lactis* towards the breakdown of plant material.

They showed how these scaffold proteins were successful in providing a stable surface outside the cell for chemical activity, e.g. the transformation of plant material into biofuels.

"This is the first study to show how the scaffolding proteins, can be secreted and localized to the cell surface of

Lactococcus," says Dr. Martin, who is also Canada Research Chair in Microbial Genomics and Engineering.

"Exporting these proteins and localizing them to the outside of the cell is a huge milestone. This can enhance the efficiency of any bioprocesses or the breakdown of organic materials."

What's promising about this research, stresses Professor Martin, is how the scaffolding proteins of *Lactococcus lactis* appear to bond with multiple compounds. "Our next step will be to engineer larger more complex scaffolds that can encourage other bio-processes that can eventually enhance the yield of fuels in a manner that is commercially viable."

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