

Algae as chemical raw materials

June 30 2014

Chemists and biologists at the University of Konstanz have succeeded in transforming algae oil into high-quality chemical raw materials via so-called isomerizing alkoxycarbonylation. This provides the foundation for the use of algae as a basic chemical component for a broad spectrum of materials and products, beyond the use of algae as a substitute for crude oil. The research results have been published in the current edition of the scientific journal *Angewandte Chemie*.

"We are very interested in probing the possibilities of using algae as a potential raw material in chemistry," says the chemist, Professor Stefan Mecking, whose research group carried out the studies together with biologists surrounding the algae expert Professor Peter Kroth, all at the University of Konstanz. "Research efforts around the globe are looking into the use of algae as a substitute for [crude oil](#) and fuel, especially kerosene. We want to go a step further and not only gain a replica of crude oil from algae, but also transform them into high-quality [chemical](#) constituents for use as chemical raw materials. In comparison with conventional vegetable oils, such as sun flower or rapeseed oil, algae oils have a significantly different structure which makes them attractive for the production of entirely different materials," Professor Mecking explains.

Algae are already regarded as a possible base raw material for future sustainable energy production. "Algae do not occupy any agricultural space, and they can be grown very quickly and efficiently," comments Peter Kroth on the agricultural benefits of algae. As the Konstanz researchers have now shown, the full potential of algae – in addition to

their possible use as a crude oil substitute - has definitely not been exhausted yet. They succeeded in transforming algae oil into functional chemical components in a catalytic process with a high level of selectivity. "During this reaction a functional group from the centre of the molecule is transformed into an ester group at the end of the molecule. In the past, this conversion was often described as 'a dream reaction'," says Stefan Mecking.

"We are especially grateful to the participating doctoral students who picked up our idea on their own initiative and put it into practice," Peter Kroth stresses. Further research into [algae](#) will be integrated especially in the studies of doctoral students at the Konstanz Research School Chemical Biology.

More information: P. Roesle, F. Stempfle, S. K. Hess, J. Zimmerer, C. Río Bártulos, B. Lepetit, A. Eckert, P. G. Kroth, S. Mecking: "Synthetic Polyester from Algae Oil." *Angew. Chem. Int. Ed.* 2014, published online ([DOI: 10.1002/anie.201403991](https://doi.org/10.1002/anie.201403991))

Provided by University of Konstanz

Citation: Algae as chemical raw materials (2014, June 30) retrieved 6 May 2024 from <https://phys.org/news/2014-06-algae-chemical-raw-materials.html>

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