## **Renewable Feedstocks: New Syntheses with Oils and Fats**

Jürgen O. Metzger, Ursula Biermann, Institute of Pure and Applied Chemistry, University of Oldenburg, Germany

Fats and oils are at present the most important renewable raw materials for the chemical industry and it can be expected that their importance will steadily increase in the future.<sup>[1]</sup> A large number of novel fatty compounds have been synthezised by C,C-bond forming addition reactions to the C,C-double bond of unsaturated fatty compounds. Radical reactions such as the solvent-free addition of  $\alpha$ -halocarboxylic acid esters initiated by electron transfer e.g. from copper to give fat-derived y-lactones are described as well as Lewis acid induced electrophilic addition reactions yielding new oleochemicals such as alkyl branched fatty acids, alkyl substituted 4-chlorotetrahydropyrans and primary homoallylic alcohols.<sup>[2]</sup> Plant oils with interesting and unusual functionalties are available offering new possibilities for synthetic transformations. Diels-Alder additions to calendic acid and  $\alpha$ -eleostearic acid have been performed with high stereoselectivity and high regioselectivity. Fatty compounds containing heterocyclic moieties have been synthesized. Finally, the question will be discussed which chemical reactions and processes have to be developed to enhance the application of fats and oils in the chemical industry, especially for the synthesis of base chemicals.

<sup>[1]</sup> U. Biermann, W. Friedt, S. Lang, W. Lühs, G. Machmüller, J.O. Metzger, M. Rüsch gen. Klaas, H.J. Schäfer, M.P. Schneider, "New Syntheses with Oils and Fats as Renewable Feedstock for the Chemical Industry", *Angew. Chem.*, **2000**, *112*, 2292-2310, *Angew. Chem. Int. Ed.* **2000**, *39*, 2206-2224.

<sup>[2]</sup> U. Biermann, J. O. Metzger, "Catalytic C,C-Bond Forming Additions to Unsaturated Fatty Compounds", *Topics in Catalysis*, **2004**, *38*, 3675-3677.