European Journal of
Lipid Science and Technology
www.ejlst.com

Fats and Oils as Renewable Feedstock for the Chemical Industry

Jürgen O. Metzger and Michael A. R. Meier

During their General Assembly on September 25, 2015, the United Nations adopted the resolution "Transforming our world: the 2030 Agenda for Sustainable Development" with 17 Sustainable Development Goals. Goal 12 claims to ensure sustainable consumption and production patterns, inter alia to achieve a sustainable management and efficient use of natural resources by 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse. An environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and to significantly reduce their release to air, water, and soil in order to minimize their adverse impacts on human health and the environment are explicitly mentioned.[1] Renewable feedstocks are an important aspect for the implementation of Goal 12. The utilization of renewables in general, and fats and oils in particular, as feedstock for the chemical industry and the use of products based on renewables is steadily advancing. Scientists are challenged to contribute to this important development goal.

Necessarily, and nevertheless remarkably, the sustainable use of renewable resources has become a hot topic of research during the last years. Let's have a look on the development of the key word "renewable resources" in Web of Science from the sixties of the last century until today, being the period of petrochemistry (**Figure 1**). During the sixties, seventies, eighties renewables were almost unknown to the scientific community and without any significant scientific interest. However, beginning in the seventies we can observe a very slight increase of the number of manuscripts dealing with renewables that turns out to be the start of an exponential growth. In the year 2016, "Web of Science" lists more than 2400 manuscripts on the topic. The doubling time is about 4–5 years. Thus, in 2020 we can expect about 5000 papers if the trend continues, which can be expected.

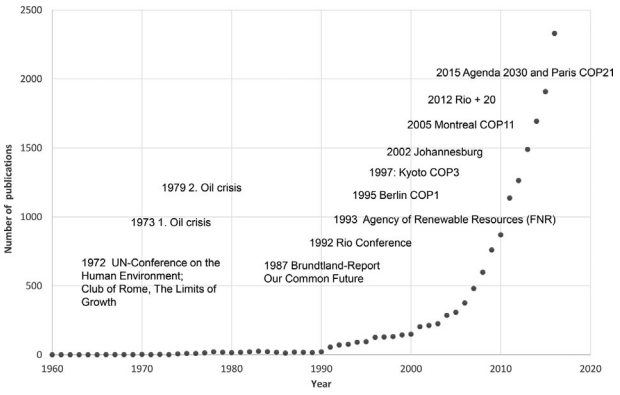

Figure 1. Number of scientific publications with key word "renewable resources" referenced in Web of Science 1960–2016, and historical events that stimulated research on "renewable resources."

DOI: 10.1002/ejlt.201700460

Jürgen O. Metzger studied chemistry at the universities of Tübingen, Erlangen, Berlin, and Hamburg, Germany. He received his Ph.D. under the supervision of H. Sinn in 1970 at the University of Hamburg, and completed his habilitation in 1983. In 1991, he was appointed professor of organic chemistry at the University of Oldenburg, Germany, and he retired in 2006. He is chairman of abiosus e.V., a non-profit association for the advancement of research on renewable raw materials. His research areas include sustainability in chemistry, environmentally benign organic synthesis, renewable raw materials, radical chemistry, and mass spectrometry.

Michael A. R. Meier is full professor at the Karlsruhe Institute of Technology (KIT, Germany) since 2010. He received his diploma degree (M.Sc.) in chemistry in 2002 from the University of Regensburg (Germany) and his PhD under the supervision of Prof. Ulrich S. Schubert from the Eindhoven University of Technology (The Netherlands) in 2006. His research interests include the sustainable use and derivatization of renewable resources for polymer chemistry as well as the design of novel highly defined macromolecular architectures.

Several important events stimulated the scientific interest in renewable resources. The first United Nations Conference on the Human Environment was held in Stockholm, Sweden in 1972 and in the same year "The Limits to Growth" by the Club of Rome appeared.[2] In 1973 the first and in 1979 the second oil crisis occurred, increasing the awareness to the topic. Thus, the seventies exhibited already 82 papers dealing with renewables. In the eighties, the most important stimulus was the Brundlandt-Report in 1987.[3] It discussed a sustainable development for our common future and prepared the United Nations Conference on Environment and Development held in 1992 in Rio de Janeiro. The Climate convention, the Rio declaration on sustainable development and Agenda 21, the

comprehensive plan of action for the 21st century were adopted by more than 170 governments. One year later, the Agency of renewable resources was founded in Germany. The climate convention of Rio de Janeiro established the yearly "Conferences of the Parties (COP)" to assess progress in dealing with climate change. COP 1 started in Berlin 1995 and was followed by many others such as Kyoto 1997, Montreal 2005 and Paris 2015. We should not forget the Johannesburg Conference 2002 and Rio + 20 in 2012. All these events give evidence that the environmentally sound and sustainable use of renewable natural resources is essential on the way to a sustainable development.

The 9th Workshop on Fats and Oils as Renewable Feedstock for the Chemical Industry took place March 19–21, 2017 in Karlsruhe, Germany, organized by abiosus e.V. in cooperation with the Agency of Renewable Resources (FNR), Germany. Thirty lectures and forty posters provided an update on the newest developments in the field of fats and oils as renewable feedstock for the chemical industry. Some of them are summarized in this special issue, demonstrating the advances made in the field and that "oleochemistry" remains a very active field of research that can provide very valuable contributions for a sustainable development.

Eventually, we would like to invite you to participate at the 10th workshop on "Fats and Oils as Renewable Feedstock for the Chemical Industry," which will be held again at the Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany, from March 17–19, 2019. Hopefully you will have the opportunity to participate. We are looking forward to exciting and fruitful discussions with you, the fats and oils community. The program and additional information will be available in September 2018 (http://abiosus.org/meetings.html.de).

Jürgen O. Metzger

Michael A. R. Meier

[1] United Nations, Transforming our world: The 2030 Agenda for Sustainable Development, 2015, http://www.un.org/ga/search/view_doc.asp?symbol = A/RES/70/1&Lang=
[2] D. H. Meadows, D. L. Meadows, J. Randers, W. W. Behrends, III, The Limits to Growth; A Report for the Club of Rome's Project on the Predicament of Mankind, *Universe Books*. New York, NY **1972**.
[3] United Nations World Commission on Environment and Development, Our Common Future (Brundtland Report), 1987. https://en.wikisource.org/wiki/Brundtland_Report