

Editorial



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There is a clear need for our societies to considerably reduce our dependency on fossil fuels. During the 2015 Paris Climate conference ambitious but necessary targets were set to reduce CO₂ emissions by 48–50% (vs 1990 emissions). This agreement was ratified by the Swiss Federal Government (Bundesrat).

As of today, the world is, for a substantial part, using oil-derived resources to produce energy but also as starting materials to make many products of daily consumption. One of the paths to reduce this dependency is to switch to the use of renewable raw materials. As a general rule, one would consider a resource as renewable when it can regenerate itself on a human-timescale, as opposed to oil which is formed over a multi-million-year timeframe.

On October 20th, 2021, the SusChem Switzerland group from the Swiss Chemical Society will be organizing the second edition of the Swiss Green&Sustainable Chemistry Day. The program will feature a mix of world-class academic professors active in this field as well as industrial applications presented by speakers from different companies. The one-day symposium will take place in Basel – *as part of the ILMAC trade fair* – and is a unique opportunity to learn more about this field and its challenges.

This special issue is intended to complement this event and provide a perspective on the path towards renewable raw material-based production. Actors both from academia and industry share examples of active research efforts to valorize renewable resources. A summary is provided below.

Catalysis is a key enabler to turn biomass-derived feedstock into useful fuels, bulk or fine chemicals. **Alexis Bordet, Walter Leitner et al.** nicely report on the progress their group made on the development of selective and remarkably stable rhodium supported catalysts for the hydrogenation of biomass-derived furfuralacetone.

As techniques and scaled demonstrations for CO₂ capture are increasing, a clear need to be able to valorize this inert small molecule is needed. **Abhijit Dutta, Peter Broekmann et al.** provide an overview of electrochemical methods, Cu and Bi catalysts in particular, which are able to turn CO₂ into alcohols and formate salts respectively.

Plastic is virtually everywhere and has revolutionized packaging, automobile, construction, goods in general and many more applications. The exponential growth of the demand for plastic gives rise to serious concerns, since for the biggest part, these are made from oil-derived monomers. The concerns lie both on the resource availability and on the disposal after end-of-life. **Felix Bobbink et al.** provides an overview how plastic is currently being utilized and how alternative production methods from renewable sources are rising up. Turning waste into something useful, *i.e.* circular economy, is a highly desirable objective, methods for end-of-life valorization of plastic are also presented in this contribution.

Surfactants have extremely useful properties which have been used to improve the solubilization of oils and fats into aqueous solutions. **Jakob Mueller et al.** describe in their report the challenges and opportunities of biosurfactants, made out of sugars, oils and fats, as useful alternatives to the oil-derived surfactants for their use in cleaning and cosmetic products.

Sugars represent a substantial resource of energy directly provided by Nature. **Maurus Marty et al.** provide industrial highlights of production processes which are, using recombinant microorganisms, transforming such renewable raw materials into high-value fine chemicals, *i.e.* nutritional products and aroma ingredients.

Vitamins are very essential nutrients for humans but also for animals. These are sensitive and degrade rapidly in their natural forms. In addition, they tend to be very poorly available in aqueous solutions. For this reason, emulsifiers have been developed such that these challenges are circumvented. **Christian Schäfer et al.** showcase several such examples of emulsifiers developed at DSM and prepared from starch, pectin or lignosulfonates.

Agriculture contributes for a substantial portion to global CO₂ emissions. Crop protection agents are playing a key role in making the use of fertile land as efficient as possible. **Edouard Godineau et al.** provide an overview how scientists from the field have and continue to develop efficient tools prepared from natural resources to secure high farming yields.

Maud Reiter et al. review the chemical methods for the preparation of products and intermediates from upcycled wood waste, specifically Crude Sulfated Turpentine, coming as waste from the paper and pulp industry. This article highlights the growing impact and potential of bio-renewable sources and illustrates the power of waste valorization.

When climate change is being discussed, energy is a, if not the primary factor. **Michael Studer et al.** provide in their article a holistic view about energy demand within Switzerland and puts it into perspective vs the World. In addition they summarize insights into the useful technologies which are being developed to decarbonize the earth, such as the valorization of biomass.

We hope you find the issue instructive and a good source of encouragement or inspiration for your efforts!

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The Editorial Board of CHIMIA warmly thanks the guest editors Edouard Godineau, Fabrice Gallou and Urban Jenelten for organizing this excellent collection of articles that provide insight into efforts towards renewable raw material-based production and valorization of renewable resources in both industry and academia.