EuroSciCon

MICROWAVE TECHNOLOGY FOR BIOREFINING

Duncan J Macquarrie

Green Chemistry Centre of Excellence, Department of Chemistry, University of York, Heslington, York, YO10 5DD, UK

The requirement to move away from fossil-derived products towards renewables is increasingly critical. This holds both for energy and for chemicals, the vast majority of which are still produced from oil. In the search for alternatives, biomass stands out as a potential replacement in both fields. It is rich in complex chemical structures, which could potentially be converted to a range of chemical products, replacing petrochemicals in a wide range of sectors. It also has the potential to be converted into fuels.
As much of biomass is grown as crops, it is important to avoid competing with food production. However, it is also clear that the majority of a food plant is actually inedible (certainly to humans) as it is composed of lignocellulosic material. This non-food component of crops is currently treated as a waste or a low value product, often contributing little to the economic viability of the producers.
This presentation will focus on predominantly microwave based routes to deconstruct and valorise this non-food biomass, leading to a range of potential products (chemicals, materials and fuels) which allow the possibility to replace fossil-based products and also improve the financial viability of farming. Case studies will be given of both terrestrial biomass and aquatic (macroalgae) demonstrating the potential of the approach to utilise the biomass fully.

Keywords—*biomass conversion, biorefinery, green chemistry, microwave*

Professional Biography

Duncan Macquarrie completed his PhD at Strathclyde University in 1986, and has spent 10 years in industry carrying out process research and scale up. He subsequently was awarded a Royal Society University Research Fellowship at York, where he has worked since, carrying out research in catalysis, and more recently, biomass conversion and microwave technology. He is the author of 200 research papers and 16 patents. He has served on the Editorial Boards of several journals, was one of the founders of the RSC journal *Green Chemistry* and served on the National Council of the RSC.



duncan.macquarrie@york.ac.uk