

Chemistry for Tomorrow's World

Conversion of biomass feedstocks



Biomass is a renewable energy source derived from living, or recently living, organisms. Biomass feedstocks include agricultural, forestry and municipal wastes, which can be broken down and converted into valuable products such as energy, fuel and a variety of chemicals.¹

Commercialisation of these processes using locally available waste materials has the potential to rejuvenate rural economies and improve the energy independence of many nations. Governments are implementing increasing amounts of legislation to protect the environment and mitigate climate change and the world urgently needs alternatives for the production of fuels and chemical products. To capitalise on the potential of this field it will be vital for continued research, along with financial incentives backed by governments to help establish a market.

How can the chemical sciences help?

- There are two main routes for conversion of biomass: those that use biological means such as enzymes and bacteria, and those that break down biomass using heat.
- For the biological route to become commercially viable, scientists will need to improve the efficiency to allow products to be produced in increased volumes over shorter time scales.
- The route that uses heat requires a lot of energy and therefore the heating efficiency must also be improved.
- Regardless of the process used, collaboration between engineers and chemists will improve the processes to produce purer end-products; this will mean that high quality fuels and chemical products are directly manufactured and available for use.
- To ensure that biomass feedstocks are broken down and used to their full potential it is important that chemists understand the chemical nature of the starting materials and their components. Specific methods can then be designed to selectively break down each component.
- The chemical and pharmaceutical industries are currently built upon feedstocks from petroleum. Chemists and engineers will need to alter the production methods towards using biomass-derived chemicals so that these industries can become sustainable.

About the RSC & Chemistry for Tomorrow's World

The Royal Society of Chemistry (RSC) is the leading society and professional body for chemical scientists. Over 2008 and 2009, it gathered expert views to identify priority areas where the chemical sciences can play an important role in the development of society.

For more on this initiative please visit our website: www.rsc.org/roadmap, contact us at roadmap@rsc.org or call the RSC science team on +44 (0)1223 432424.

¹ *What is a biorefinery*, National Renewable Energy Laboratory, www.nrel.gov/biomass/biorefinery.html