Biomass resources as a source of raw materials for chemical production.

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Abstract

As the chemical industry relies heavily on carbon, biomass is one of the only bulk sustainable carbon feedstocks that can be used to provide it. Waste biomass offers a solution to both decarbonize and create a circular economy. The world would benefit more from recycling biogenic carbon dioxide as opposed to adding fresh, previously subterranean carbon dioxide to the atmosphere. Many of the important goods in the UK's Chemical Manufacturing sector may have an alternative to petrochemicals in the form of biomass. The target audience for this research is individuals who can actually affect change in the chemical manufacturing industry. Infrastructure, money management, and legislators' knowledge of biomass's potential are all vital. Our recommendations for enabling the transition to biomass feedstocks include: mapping the UK biomass sources and their applications, developing a prioritised list of high value chemicals refined from biomass sources, securing further engagement across the supply chain, and the formation of an open and accessible biomass refinery, among others.

Keywords: Biomass, Petrochemicals, Chemical manufacturing industry, Public health, Industrial Biotechnology.

Introduction

Our infrastructure, economics, and public health all depend on the large amount of chemicals that the chemical manufacturing industry produces. These products' primary raw materials, mostly crude oil and natural gas, are derived from non-renewable fossil fuels. In order to meet net zero aims and global sustainability objectives, the sector must adapt and "go green." By burning vast quantities of organic materials to produce electricity, biomass has recently been promoted as a "carbon-neutral" bioenergy solution, however in many cases, this is not the most efficient or sustainable use of biomass [1]. Burning biomass as a less expensive substitute for fossil fuels ignores its potential to supply a vast array of highly valuable compounds that the chemical manufacturing industry sorely needs. For extracting the most value from various biomass feedstocks, the Industrial Biotechnology (IB) and Engineering Biology (EB) communities have already created a variety of sophisticated technologies [2]. Many of these technologies have been successfully scaled up and have become established businesses, such as Croda, Cellucomp, and Fiberight, to name just a few, who are thriving in this field and producing essential high-value chemicals and materials for market success. Though many more innovations have already been tested and show tremendous commercial promise, they must still overcome formidable scale-up challenges in order to advance to the next level of technological readiness. However, the underlying science keeps progressing quickly. Collaboration from all stakeholders is required for this sector to change successfully and quickly enough to meet the governments net zero commitments. Additionally, it's critical that end users in the chemical industry and biomass producers (farmers and growers) participate in these discussions so that they may make informed decisions about the production and consumption of biomass that will support this biomass revolution. Responding to the recommendations that will be presented in this study requires widespread engagement [3].

Many of the advantages of using biomass as an alternative to petrochemicals are dual in nature, lowering both the need for non-renewable fossil fuels and the production of non-toxic byproducts that may be recycled back into the soil after their usefulness has been taken. Our poll respondents also mentioned waste biomass and byproducts as maybe one of the sources that the general public thinks of first [4]. This category includes everything obtained from an existing process or organic material that is discarded as waste, such as food waste, municipal solid waste, crop residues, and by-products of bioprocesses like used grains for whisky. Because it mostly uses end-of-life carbon and doesn't need a sizable area of land set aside for its growth, this type of biomass has a smaller carbon footprint. Without significant modifications to current farming practises, further growth of waste biomass as a source will move closer to a circular economy in this area [5].

Conclusion

From growers and farmers to the community of innovators to end users in the chemical manufacturing sector, there must be involvement and collaboration along the biomass-chemicals

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supply chain for the benefit of both the environment and the economy. With the end objective of a sustainable and circular chemicals sector, engagement between all of these stakeholders and convincing evidence of the advantages of this transition to key policymakers will open financing and influence policy. Even with current technologies and their increased sophistication in the upcoming years, the shift away from petrochemicals won't be easy, but it's important to meet global sustainability and environmental goals. A thorough map of biomass availability, a prioritised list of chemicals, supply chain involvement, and a central financial catalyst would alter this industry and ensure the production of essential chemicals as we transition away from fossil fuels for a sustainable future.

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