

Editorial

Research Topic: Envisioning the Future of Industrial Bioprocesses Through Biorefinery

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Biorefinery is generally described as a facility integrating the conversion of biomass into new chemicals, fuels, and other commercial products and commodities. Supported by the Circular Economy concept, the Biorefinery scope is now enlarging to the conversion of residues, co-products and wastes. Worldwide, academia and industry believe that Biorefinery will soon play a crucial role in the economy, considering the outstanding growth of population and the increased needs for food, energy, chemicals, materials, pharmaceuticals and other products and acknowledging society is moving towards a bio-based economy. For a successful market implementation of an integrated Biorefinery, all process unit operations must be technically improved. Moreover, the sustainability of the biomass-to-products chain must be guaranteed, which requires proposing new process developments ensuring both economically profitable bioprocesses and an absence of adverse environmental impacts.

Forestry, food, marine and freshwater sectors are some of the most relevant players under the concept of Biorefinery, but they have been until now largely unexplored. Experts are working worldwide on the development of new or improved processes in order to address most issues attributed to so-called Biorefinery failure. Their efforts, however, are often not recognized and the resulting potential development of new products included in cosmetic, pharmaceutical, food, feed, medicine, and nutraceutical sectors are compromised. Considering the background provided in this Research Topic, our intention is to call the attention of academia, industry and society for the chemical richness that is yet being ignored, not only by the producers of these residues and raw materials, but also by the players of the principal sectors of activity worldwide.

As initial proposal, this Research Topic intended to present and discuss the relevant actions under development considering the theme of biorefinery, particularly, through the analysis and discussion of the three main ivory towers of biorefinery: (i) raw materials and residues; (ii) new or improved processes; and (iii) new products for old markets and old products for new markets. Envisioning our major goals as Editors and the principal demands of the field, several authors all over the world, leaders in their respective areas of research, were invited to collaborate with us on this Research Topic. Fortunately, this challenge was accepted, and 7 manuscripts were successfully published with corresponding contributions respecting our main vision for this Research Topic.

In summary, this issue includes four works in which microalgae, marine residues and agro-food residues are explored within a biorefinery concept, while the three other studies have demonstrated how new techniques/technologies and alternative solvents can contribute for the appropriate development of the Biorefinery strategies, in particular through the process optimization and subsequent biotechnological applications. The quality and novelty of the studies of this Research Topic have caught our interest and, as invited editors of this issue, we hope that all these valuable contributions will help researchers and biorefinery-related professionals to develop a multidisciplinary, comprehensive and integrated valorisation of underexplored raw materials within the Biorefinery and Circular Economy strategy.

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