Lignin, an innovative biomolecule: case studies focused on a circular economy approach in Northwestern Europe

Aurore RICHEL

University of Liège, BELGIUM
a.richel@uliege.be

In Europe, circular economy approaches are currently developing and benefiting from both public and private support. In particular, the emergence of agricultural, forestry, and industrial conversion waste and by-products has created interest in defining valorization loops involving lignocellulosic materials [1]. While initiatives have been established for the valorization of the polysaccharides that constitute lignocellulose, significant research efforts have also been directed towards lignin. This presentation will thus review various studies, particularly those conducted at the University of Liège, which focus on the entire lignin value chain [2].
First, we will explore how to effectively select a raw material for the specific isolation of lignin. In the second part of the presentation, we will examine the promising research avenues that stand out from previous state-of-the-art efforts. We will see that lignin, often exploited as an antioxidant or reinforcing agent can also serve as a base material for the design of fuels or additives, unique material for obtaining electrically conductive films, as well as to produce new devices for wastewater treatment [3-5].

References

[1] S. de Crane d'Heysselaer, L. Bockstal, N. Jacquet, Q. Schmetz, A. Richel, *Waste Manag. Res*. **40**(7) 1007 (2022)
[2] T. Berchem, Q. Schmetz, T. Lepage, A. Richel, *Front. Chem.* **8** 479 (2020)
[3] O. Rochez, G. Zorzini, J. Amadou, M. Claes, A. Richel, *J. Mat. Sci.* **48**(14) 4962 (2013)
[4] L. Costes, F. Laoutid, M. Aguedo, A. Richel, S. Brohez, C. Delvosalle, P. Dubois, *Eur. Polym. J*. **84** 652 (2016)
[5] M.F. Tiappi Deumaga, N. Jacquet, C. Vanderghem, M. Aguedo, H.G. Thomas, P. Gerin, M. Deleu, A. Richel, *Waste Biomass Valor*. **11**(5) 2183 (2022)

Lignin, an innovative biomolecule: case studies focused on a circular economy approach in Northwestern Europe

Aurore RICHEL

University of Liège, BELGIUM
a.richel@uliege.be

BIO

Aurore Richel (F) holds a Ph.D. in Chemical Sciences from ULiège (University of Liège). She currently serves as a Full Professor (tenured) and heads the Laboratory of Biomass and Green Technologies at the University of Liège (Belgium). Her expertise lies in research and teaching related to renewable resources chemistry and green chemistry. A. Richel is involved in numerous national and international research projects focused on bioenergy and bioproducts production, including the development of innovative protocols for producing new bioplastics or alternative fuels for the road or air transport sectors from plant biomass, within a circular economy framework. She has authored over 185 publications in international journals, several book chapters, patents, and a scientific book titled "Lignin and Hemicelluloses in Biorefineries" (CRC Press). She is also engaged in chemistry popularization through her personal website (www.chem4us.be) and the development of an online course (MOOC available on the French platform FUN) dedicated to "biomass and green chemistry." In March 2023, she was elected as a full member of the Royal Academy of Sciences, Letters, and Fine Arts of Belgium.