Syringaresinol: a new bio-based bisphenolic building-block for polymer synthesis

AUTHORS
Marine JANVIER / CHAIRE ABI, 3 RUE DES ROUGES TERRES, ROUTE DE BAZANCOURT, POMACLE
Abdus Samad JAUFURALLY / CHAIRE ABI, CEBB 3 RUE DES ROUGES TERRES, ROUTE DE BAZANCOURT, REIMS
Louis HOLLANDE / CHAIRE ABI, CEBB 3 RUE DES ROUGES TERRES, ROUTE DE BAZANCOURT, REIMS
Yixian CHEN / CHAIRE ABI, CEBB 3 RUE DES ROUGES TERRES, ROUTE DE BAZANCOURT, POMACLE
Paul-Henri DUCROT / INSTITUT JEAN-PIERRE BOURGIN, INRA, AGROPARISTECH, CNRS, UNIVERSITÉ PARIS-SACLAY, RD10, VERSAILLES
Florent ALLAIS / CHAIRE ABI, CEBB 3 RUE DES ROUGES TERRES, ROUTE DE BAZANCOURT, POMACLE

PURPOSE OF THE ABSTRACT
The increasing scarcity of fossil resources combined to stricter regulations (e.g., REACH) recently promoted the use of renewable molecules, through sustainable synthetic processes. Lignin, a biopolymer constituting cell walls in vascular plants, raised a particular interest in biomass valorization. In the actual socio-economic context, its high abundance (30% of the organic carbon in the biosphere[1]) and availability (by-product of paper industry, without competition with food uses) make it a prime candidate. This biopolymer, consisting of p-hydroxyphenyl alcohols (aka monolignols),[2] is considered as a promising alternative source of phenolic materials to replace oil-based aromatic compounds.

Dedicated to the valorization of lignocellulosic-derived phenolic compounds, our team explored the valorization of sinapyl alcohol, a key intermediate in the synthesis of syringaresinol (SYR), a naturally occurring bisphenol. SYR was efficiently obtained through dimerization of sinapyl alcohol using a highly selective laccase-mediated enzymatic process (high yield and purity).[3] This bisphenol was evaluated as a non-toxic and biobased alternative to bisphenol A, a reprotoxic substance extensively used in the polymer industry. Firstly, epoxy derivative SYR-EPO was synthesized and evaluated as a biosourced alternative to DGEBA (DiGlycidyl Ether of Bisphenol A) for the synthesis of polymers/resins such as epoxy-amine resins[4] and Non Isocyanate PolyUrethane (NIPU)[5] (Scheme 1). Moreover, ?,?-diene derivatives have been polymerized via ADMET[6] and thiol-ene coupling[7].

In this poster, the synthesis, functionalization and polymerization of syringaresinol SYR will be described. Properties of the resulting materials (DSC, TGA, DMA, IR, HPLC-SEC) will be discussed.
FIGURES

FIGURE 1
Scheme 1
Syringaresinol: synthesis, functionalisation and polymer valorization

FIGURE 2

KEYWORDS
syringaresinol | bisphenol | epoxy-amine resins | thiol-ene coupling

BIBLIOGRAPHY