

9th World Congress on

Green Chemistry and Technology

September 17-19, 2018 | Amsterdam, Netherlands

A holistic approach to tannins chemical functionalization towards tailored surface adsorption properties

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Tannins are a major source of polyphenolic components after lignin, with 160,000 tons potentially biosynthesized each year. Due to their excellent protein complexing ability, tannins have different metabolic and biological roles, such as cell wall construction, against worms, fungi, bacterial and UV protection that made tannins perfect natural biofilm control agents in human daily life. Tannins possess multiple structure units featured on aromatic oligomer or macromolecular with free phenolic groups and usually classified into hydrolysable tannins that consist of esters of gallic acid with a core sugar, and condensed tannins that are oligomers or polymers of flavan-3-ol units. The aim of our work has focused on the tailoring of hydrophobic/hydrophilic properties of different tannins. A general chemical process for specific tannin functionalization has been developed and a library of specifically functionalized tannins carrying additional functional groups in specific loading factors has been created. More specifically ammonium groups, carboxylic groups and PEG have been successfully linked to an array of five different tannins possessing different chemical structures. The products were fully characterized by quantitative ³¹P NMR, ¹H NMR, HSQC, MALDI.

Biography

Lili Zhen has obtained her Master's degree in Textile Chemistry, Dyeing and Finishing Engineering from the National Key Laboratory of Eco-Textile of the Jiangnan University in China in 2016, with an experimental thesis entitled 'Thermoplastic modification research of rice straw through graft copolymerization with PEG'. Prior to this, in 2013, she has obtained her Bachelor's degree from Jiangnan University working on Light Chemistry Engineering. In 2016, she was chosen as a PhD student within the H2020 program BIOCLEAN under the supervision of Professor C Crestini at the University of Roma 'Tor Vergata', Italy.

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