

MWP – Young Researcher Abstract 2024

Project title: Ethylation of lignin improving its compatibility in polylactic acid composites as alternatives to fossil-based materials	
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Abstract (approx. 200 words): <p>Thermoplastics are essential to our everyday life and are used in most fields of applications. They are mainly made from fossil-based materials, which harm the environment. Therefore, we are investigating alternatives to these materials by utilizing polylactic acid (PLA) and ethyl-modified lignin.</p> <p>PLA is a renewable and biodegradable thermoplastic used in e.g., food packaging and medical devices. Although it has many advantages, it is a brittle material with low impact strength, the production is costly, and biodegradation is slower than for other biodegradable plastics. This limits the usage of PLA. By incorporating lignin, the most abundant naturally occurring aromatic polymer, we hope to tackle some of PLA's shortcomings. Insufficient compatibility between PLA and lignin can be a limiting factor, and by ethylating the lignin, this can be avoided. The thermoplastics' compatibility, mechanical properties, 3D printability, and reproducibility are studied.</p> <p>Lignin is regarded as a low-value by-product in the forest-based industry and is not used to its full potential. Due to the abundance and aromaticity of lignin, it has high potential as an alternative to fossil-based materials. Thus, we harness lignin's high-value potential by studying PLA-lignin thermoplastic formulations.</p>	
Key words: Lignin, polylactic acid, PLA, ethylation, thermoplastic	