MWP – Young Researcher Abstract 2026

Project title:
Role of lignin in high-yield fiber property formation

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Abstract (approx. 200 words)**:**

My research is part of the Emission Free Pulping (EFP) project, which seeks high-yield fiber production with lower emissions and minimal material loss.
I explore how lignin-rich wood fibers can be used more efficiently in high-yield papermaking. Instead of extensively removing lignin, I investigated mild nucleophilic treatment to selectively modify lignin-rich fiber surfaces while retaining most of the wood material. My results show that controlled treatment can functionalize fiber surfaces, promote fibrillation and fiber-fiber bonding, and substantially improve paper strength while maintaining high material yield.
This approach could help the forest-based industry produce stronger fiber products from less processed wood, reducing material losses and potentially lowering the need for energy and chemical intensive processing. For society, it supports more resource-efficient use of forests, lower emission production, and a stronger circular bioeconomy.
My vision is to transform lignin from an obstacle in papermaking into a functional component of high-yield fiber products. Key challenges are minimizing chemical consumption, scaling the treatment, and demonstrating environmental and economic benefits. These can be addressed through process optimization, pilot-scale validation, and energy, cost, and life-cycle assessments with industrial partners.

Key words:
Lignin modification; Nucleophilic chemistry; High-yield pulping; Fiber modification.