

MWP – Young Researcher Abstract 2026

Project title: Microemulsions made with by-products of the paper and pulp industry	
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Abstract (approx. 200 words): Wood is susceptible to degradation by bacteria and fungi, which causes significant financial damage and poses health risks. Conventional wood impregnation remains energy-intensive because it relies on elevated temperatures and vacuum-pressure cycles, contributing to high treatment costs. Historically, these processes also used highly toxic or carcinogenic preservatives such as creosote or chromated copper arsenate (CCA). Although such chemicals have been regulated and/or banned in Europe since 2004, they remain present in many older structures. Today, aqueous copper-based agents are widely used, yet copper can leach into the surrounding environment, causing long-term ecological concerns. There is a clear need for a safer, sustainable wood impregnation technology that works efficiently at ambient conditions. My project develops turpentine-based oil-in-water microemulsions derived from forestry by-products. By optimising surfactant content, salinity, and formulation ratios, I created stable microemulsions with low surface tension, low viscosity, and nanoscale droplets, specifically tailored for deep wood impregnation at ambient conditions. The result is a bio-based, high-performance impregnation system that outperforms reference limonene-based formulations, reduces chemical load, and minimises environmental impact. Unlike traditional biocides or copper treatments, my solution combines renewability and efficacy, offering a scalable next-generation technology for sustainable wood protection.	
Key words: Microemulsions, oil-in-water microemulsions, turpentine, wood decay, wood impregnation	