

MWP – Young Researcher Abstract 2026

Project title: Wood Surface Quality as a Gateway to Reliable Adhesive Bonding	
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Abstract (approx. 200 words): Adhesives are an essential part of wood-based products, from furniture panels and packaging to load bearing products. However, many industrial adhesive systems still rely on fossil-based chemistry. Replacing them with bio-adhesives is therefore not only a materials challenge, but also a necessary step toward healthier, lower-carbon, and more sustainable forest-based products. My research addresses a critical barrier limiting the wider use of bio-adhesives: the inconsistent reliability of bonding performance. Wood surface quality is central to this challenge, as substrate surface characteristics strongly influence adhesive wetting, spreading, penetration, and the formation of durable interfacial interactions with wood. By comparing selected bio-adhesives with established commercial adhesives, this research clarifies how surface free energy, roughness, porosity, raw material type, ageing and storage conditions shape adhesive behavior and the quality of bonded products. These insights provide a scientific basis for translating bio-adhesives from promising formulations into robust industrial solutions. Beyond improving individual bonding systems, the research supports better control of raw material handling, storage, processing, and product design across the wood value chain. In the long term, it contributes to a broader shift from fossil-dependent bonding technologies toward renewable, resource-efficient, and climate-conscious forest-based manufacturing.	
Key words: Bio-based adhesives, wood surface quality, wettability, interfacial bonding, sustainable wood products	