

Bio-based wood adhesives from Moroccan barks of *Acacia Mollissima*: Applied to bonding plywood panels

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With the increase of the harmful effects of fossil-based adhesives, the elaboration of adhesives from renewable resources was increasingly in demand by the industries eco-friendly. So, in order to present some solutions for these industries, the petroleum phenolic compounds were replaced in this study by natural and renewable resources. In this research, we propose to extract phenolic compounds from the Moroccan bark of *Acacia Mollissima* using a simple extraction method (a traditional maceration). We choose this spice because it contains a higher content of condensed tannins (already used to made bio-based wood adhesives). The physical, thermal, and thermo-mechanical properties of the developed adhesives were evaluated according to normative tests. The good quality of the adhesives elaborated permitted their use to made bio-based wood composites. In this study, plywood with three panels was developed and the bonding quality of these panels was compared with a standard formulation of synthetic adhesives. The mechanical properties of the plywood panels produced with bio-based adhesives showed an excellent quality of the panels compared with the standard formulations already used to made wood panels and allowed their applications in a dry application when the humidity exceed 60% a few week per an.

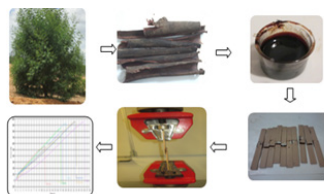


Fig 1: Chemical characterization of plywood panels bonded with biobased adhesives

Biography

After my Master in Quality Control in the Food, Pharmaceutical and Cosmetic Industries, I continued my career in the valorization of biomass. With this way, I prepared an international doctorate between the University of Pau and the Pays de l'Adour in France and the University of Hassan II Casablanca in Morocco. In 2016, I had my Double Doctorate in Polymer environment. After my Ph.D. thesis, I joined the LIMAT laboratory (Engineering Materials Laboratory) from the Faculty of Science Ben M'sik in Casablanca as a researcher and I worked with industrialists to develop environmentally-friendly bio-based adhesives used to band plywood panels. In another project, I contributed to the development of solid materials for hydrogen storage dedicated to energy systems in collaboration with various universities. In my latest postdoctoral research, I investigated the ways to seamlessly integrate natural products into patina formulations used in metallic adhesive labels for luxury fragrance and champagne packaging. My scientific expertise concerns wood chemistry, Polymer chemistry, Analytical chemistry, Extraction process, Thermal analysis, Management systems, statistical discovery and cosmetic aromatherapy.