WOODSTIC

Valorization of powders or solid wood by the development of innovative and environmentally friendly treatments by chemical modification: design of wood based thermoplastics

Principle investigator: OBOUNOU AKONG, Firmin, LERMAB (Laboratoire d'Etudes et de Recherche sur le Matériau Bois)

Collaborations: GERARDIN Philippe (LERMAB), DUMARCAY Stéphane (LERMAB), GEORGES Béatrice (LERMAB), GELHAYE Éric (UMR IAM), FRADET Fréderic (PLASTINNOV)
Co-applicant*:* Unité Mixte de Recherche Interactions Arbres/Micro-organismes (IAM)

Summary

Plastics are ubiquitous in the field of materials because they are easy to implement by different thermoforming processes. However, their petrochemical origin, their low biodegradability and their accumulation in the environment are disadvantages for their utilization in the future. The use of renewable resources for the production of bioplastics contributes to reduce the use of petrochemical resources and thus the dependence of the sector to fossil raw materials.

The WOODSTIC project aims to develop thermoplastic composites from wood using conventional thermoforming plastics techniques. These materials endowed with original properties will serve as substitutes for current plastics. They will be obtained by prior chemical modification of wood powders or solid wood and should allow recycling and / or be biodegradable at their end of life avoiding problems of accumulation in the environment.

Chemical modification of the wood (powders, veneers) by different hydrocarbon chains will be carried out. The methods chosen will use either the acylation of hydroxyl groups in the wood using fatty acids or fatty acid derivatives, or copolymerization reactions between the wood and the fatty alkyl chain vinylic monomers. The synthesized materials will be characterized using different spectroscopic, microscopic and physico-chemical methods and their durability tested in order to characterize the chemical modification and the new properties conferred on the material. Finally, we will also study the possibilities of glue-free assembly of veneers previously modified by thermocompression.

The main expected results / impacts are as follows:
-development of inexpensive methodologies that are easy to implement at the industrial level
-development of new polymer wood materials with innovative properties (thermoplastics and adhesives)
-creation of a local economy for manufacturing new materials, creation of local synergy and new skills adapted to new market developments, use of renewable resources, limitation of plastic accumulation problems ...