

DOCTORATE RECRUITMENT

Development of formaldehyde-free biobased adhesives based on by-product proteins

The wood-based composite panel industry is an evolving sector that is constantly seeking to adapt to consumer needs and regulations on volatile organic compound (VOC) emissions. The industry is constantly evolving to meet the needs of consumers who want products that have a low environmental impact and are safe for their health. However, the adhesives used in the conception of these panels are made of synthetic resins and petro-based materials, including formaldehyde classified by the World Health Organization as carcinogenic for humans and animals.

The objective of this project is to develop a biobased adhesive with properties comparable to those currently used, at a reasonable price and without formaldehyde emissions. The renewable resources used in this project will be proteins from industrial co-products. Several methods will be used to overcome the disadvantages of protein-based adhesives, such as low water resistance and low adhesive strength. For example, denaturation, which increases the accessibility of amino acid side groups hidden in the internal structure of proteins, or modification by reaction between the active function of a cross-linking agent and the active groups of the protein, will be considered. The extraction, modification and chemical analysis of proteins will be performed, and their potential studied in the formulation of biobased adhesives. The performance of the biobased adhesives will be compared to the one of their petroleum-based homologues.

The consortium is a joint initiative of a research team from Université Laval, Université de Québec en Abitibi Témiscamingue, SEREX and with industrial and government partners: FPInnovations, Produits forestiers Arbec, Sacopan, Tafisa, Uniboard, Conseil de l'industrie forestière du Québec, ministère des Ressources naturelles et des Forêts du Québec. The mission of the wood-based composite panel consortium is to contribute to the research and training of highly qualified personnel in three research areas: (1) raw materials, (2) innovative processes and adhesives and (3) products and markets.

This project is part of the "Innovative processes and adhesives" theme of the consortium. The candidate will work in collaboration with the partners of the research consortium and will be part of the Center for Research on Renewable Materials (CRMR). The members of the CRMR form a multidisciplinary and dynamic team, working for the development of new solid wood products, wood-based composites, wood fiber or lignocellulosic fiber and value-added co-products.

Graduate program

Ph.D. in Wood and Bio-based Materials Engineering, Département des sciences du bois et de la forêt, Université Laval.

Research director

Véronic Landry, Université Laval.

Candidate profile

Master's degree (or equivalent) in chemistry, chemical, wood or material engineering, or other related fields.

Requirements

Eligibility for the Ph.D. program in Wood and Bio-based Materials Engineering at Université Laval.

Conditions

25 000\$ per year, paid as a salary. Duration of 3 years.

Starting date

May 2024 or September 2024 or according to the candidate's availability

To apply

Send your resume, cover letter, and transcript to: veronic.landry@sbf.ulaval.ca and ingrid.calvez@sbf.ulaval.ca

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