

MASTER'S DEGREE RECRUITMENT

Development of a Tannin-Based Adhesive: Study of Hardeners

The wood composite panel industry is a constantly evolving sector that must continuously adapt to consumer needs and regulations regarding volatile organic compound (VOC) emissions. Consumers seek products with a low environmental impact and that are safe for health. However, the adhesives used in the manufacture of these panels are made from synthetic resins and fossil-derived materials, some of which, like formaldehyde, are classified as carcinogenic by the World Health Organization.

This project focuses on the development of bio-based adhesives using tannins sourced from the boreal forest. These tannins, extracted and purified in our laboratory, will be studied within an adhesive system. Tannin-based resins can form a cross-linked structure through autocondensation or cross-linking. Although resins obtained by autocondensation are suitable for indoor applications, their resistance to water and swelling is limited. In contrast, resins cured with cross-linking agents demonstrate better mechanical performance. Various hardeners, such as hexamethylenetetramine, tris(hydroxymethyl)nitromethane, glyoxal, glutaraldehyde, and others, will be investigated to assess their reactivity with boreal forest tannins. We will also analyze their performance in composite panels, focusing on water resistance, internal cohesion, and VOC emissions.

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 "products and markets" 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

Master's degree 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

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

Requirements

Eligibility for the master's degree program in Wood and Bio-based Materials Engineering at Université Laval.

Conditions

21 000\$ per year, paid as a salary. Duration of 2 years.

Starting date

May 2025 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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