



ALBERTA INNOVATES

AGRICULTURE AND ENVIRONMENT

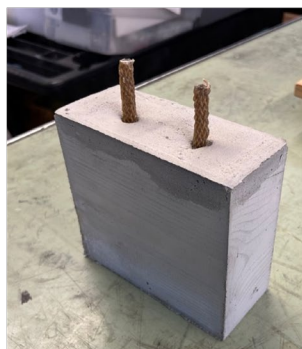
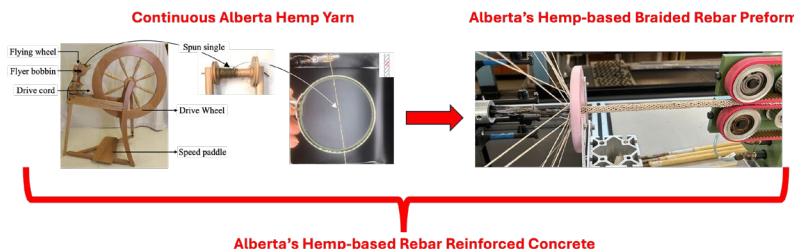
BIOINDUSTRIAL AND CIRCULAR INNOVATION

BIOINDUSTRIAL MATERIALS

FUNDING DETAILS

Towards a green future via green rebars produced using biofibers and bio-resins

The cumulative total value of the global construction industry between the years 2016 and 2030 is expected to reach US\$212 trillion. There are broad opportunities for using alternative rebar reinforcements to conventional steel rebars. We propose to study green bio-based rebars made out of Ab-based bio-fiber and bio-resin materials that are produced using a technique called braidtrusion. These rebars have unidirectional continuous regenerated cellulosic yarns in the core and overbraided hemp reinforcement in the shell layer. Finally, the rebars are impregnated with a bio-resin.



RECIPIENT:
Dr. Cagri Ayranci
University of Alberta



PARTNERS:
Alberta Hemp
Works,
InnoTech Alberta



TOTAL BUDGET:
\$615,250



AI FUNDING:
\$250,000



PROJECT DATES:
Mar 2022 –
Mar 2024



PROJECT TRL:
Start: 4
End: 7

APPLICATION

The global construction industry includes concrete and wood construction applications in buildings, and pavements and sidewalks. Although large reinforced concrete buildings mainly rely on traditional steel rebar reinforcements, there are broad opportunities for using alternative rebar systems in construction and sidewalks and pavements. The proposed green biobased rebars may form a strong alternative to the currently commercially available synthetic materials based composite rebars in the market, such as the PINKBAR by Owens Corning.

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Classification: Protected A



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PROJECT GOALS

The main objectives of the project are:

1- to develop and optimize a bio-based resin for hemp and regenerated cellulose fiber use-based composites for the construction industry that is safer and greener compared to the synthetic resins available in the market.

2- to produce continuous hemp yarns for the construction and composite materials industry using AHW's hemp fibers. This high value-added product is currently not offered by any other Canadian company.

3- to produce bio-FRPC rebars for the construction industry that will offer considerably low weight compared to steel rebars, will have improved ductility and better adhesion properties compared to commercial synthetic FRPC rebars, will be based on renewable bio-resources including underutilize hemp fibers, will have low greenhouse gas emissions.

BENEFITS TO ALBERTA

- The U of A team has designed this project with the guidance of Alberta Hemp Works that is an Alberta based hemp company.
- We have identified promising markets for composite materials. This will ensure that the research results are relevant to the quality of hemp that is currently available/will be grown in Alberta.
- The proposed rebars will be made from Alberta grown hemp. Additionally, the resin that will be used to impregnate the rebars will also be bio-based.
- Upon commercialization, the aforementioned agricultural based raw materials and the end products will create jobs for Albertans and will be a positive impact for Alberta's economy.



**2 in preparation
Publications**



**2 Students
Trained**



**100+ anticipated
Future Jobs**



**3 New
Products/Services**

CURRENT STATUS

July 2024 - COMPLETE

The official part of the project is completed. The U of A team and the partners are in discussions of the optimal ways to benefit the project learnings and outcomes. Advancing the findings and finally commercializing the products is the ultimate goal for the team and the partners.