

BIO-FIBRE – Sustainable construction with bio-composite materials

Summary

For EU countries, the European Green Deal has set ambitious objectives to become climate-neutral by 2050. Global challenge is to reduce energy consumption and greenhouse gas (GHG) emissions and to obtain prosperity and sustainable economic development. To accomplish this goal, actions across all economic sectors are needed.

"The built environment has a significant impact on many sectors of the economy, on local jobs and quality of life. It requires vast amounts of resources and accounts for about 50% of all extracted material. The construction sector is responsible for over 35% of the EU's total waste generation. GHG emissions from material extraction, manufacturing of construction products, as well as construction and renovation of buildings are estimated at 5–12% of total national GHG emissions. Greater material efficiency could save 80% of those emissions" (EC, 2022). To increase material efficiency and reduce climate impact, the European Commission has launched a comprehensive new strategy for a sustainable built environment, which promotes circularity principles throughout the lifecycle of buildings. One of the possible options is building with bio-composite materials.

Typical construction materials (e.g., plastic, steel) have a large ecological footprint. Contrary, bio-composites are the next generation of sustainable building materials, made up of a combination of eco-friendly ingredients – usually plant fibres mixed with natural resins and binders. Bio-composites help eliminate non-renewable waste, reduce raw material usage, and cut fossil-fuel consumption.

It can be stated that the construction industry is experiencing a technological and green revolution across the entire building life cycle. However, analysis of available education across European countries reveals that higher education in green construction with bio-composites is still not sufficiently developed, teachers and students lack sustainability competences, as well as green construction knowledge and skills. Bio-composites

are often neglected in civil engineering and other construction-related study programmes. The gaps in education and skills mismatches, observed in 7 universities, encouraged the new BIO-FIBRE project's idea – to develop and deliver the innovative student-centred trans-disciplinary course in green construction using bio-composite materials. For development of such education, efforts and resources of single institution are not sufficient, joint collaboration actions, sharing of know-how among different higher education institutions are necessary, moreover, to maximise the impact, international trainings of students are required. Therefore, it is expected that funding will enable participating organisations to gain experience in international cooperation, join and share trans-disciplinary knowledge, strengthen their capacities and will help to produce high-quality innovative deliverables, including innovative courses on green construction with bio-composites.



Figure 1. Example of a nature-based (timber, straw) dwelling in Portugal and a prefabricated straw-timber modular dwelling being built in Denmark.



Figure 2. Hybrid meeting in Denmark and pedagogical training for teachers in Lithuania.

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Leading Institution

Via University College (Denmark)

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Project Website

<https://sites.google.com/view/bio-fibre/home>