

Environmental life cycle assessment methods for agromaterials

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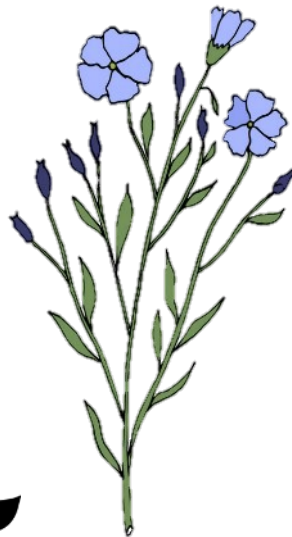
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TWO CASE STUDIES

BOPA

- SME developing a sandwich panel for an application in aeronautics using flax fiber as reinforcement material.



LUMA

- Designers valorizing the pith of sunflower stems as panels for acoustic isolation.



BOPA

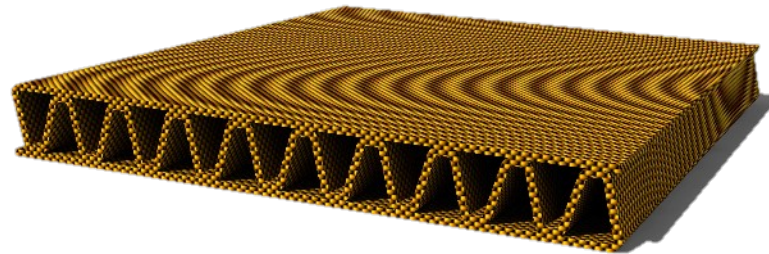
- Composite material → Fiber + polymeric resin

“A composite material is a combination of two materials with different physical and chemical properties. When they are combined they create a material which is specialized to do a certain job, for instance to become stronger, lighter or more resistant.”

- Biocomposite material → Flax fiber + epoxy resin vs glass fiber + epoxy resin.

- A biocomposite sandwich panel for an application in aeronautics to reduce fuel consumption.

Natural fibers have lower density than glass fiber and store carbon.

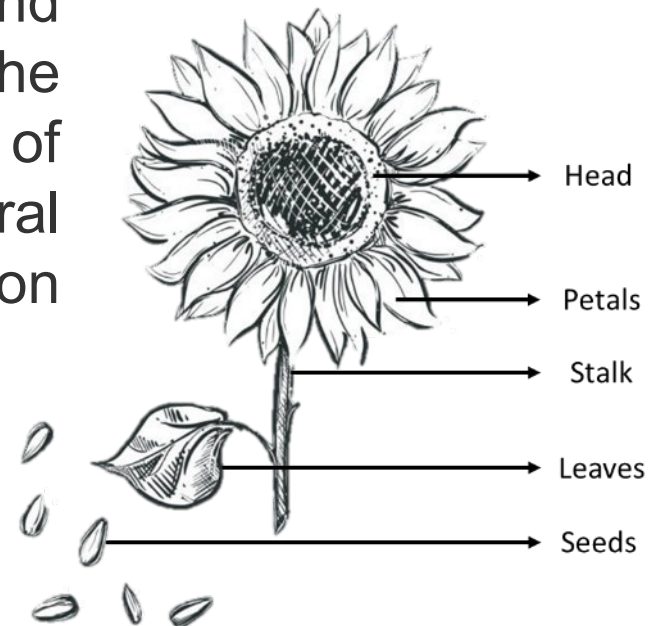


MAIN FINDINGS

- Weight is an utmost critical parameter
- Development stage of the prototype & sector's strict regulations → main constraint for weight reduction
- Cradle-to-gate approach → the biocomposite panel was more environmentally competitive in the impact climate change (34%) and marine eutrophication (30%)
- Through the use of bio-based panels as elements in interior fittings in airplanes for the next 20 years, the emission of over 75 megatons of CO₂ could be delayed
- Future work → Improvement of the fibre/resin ratio and the geometry of the prototype

LUMA

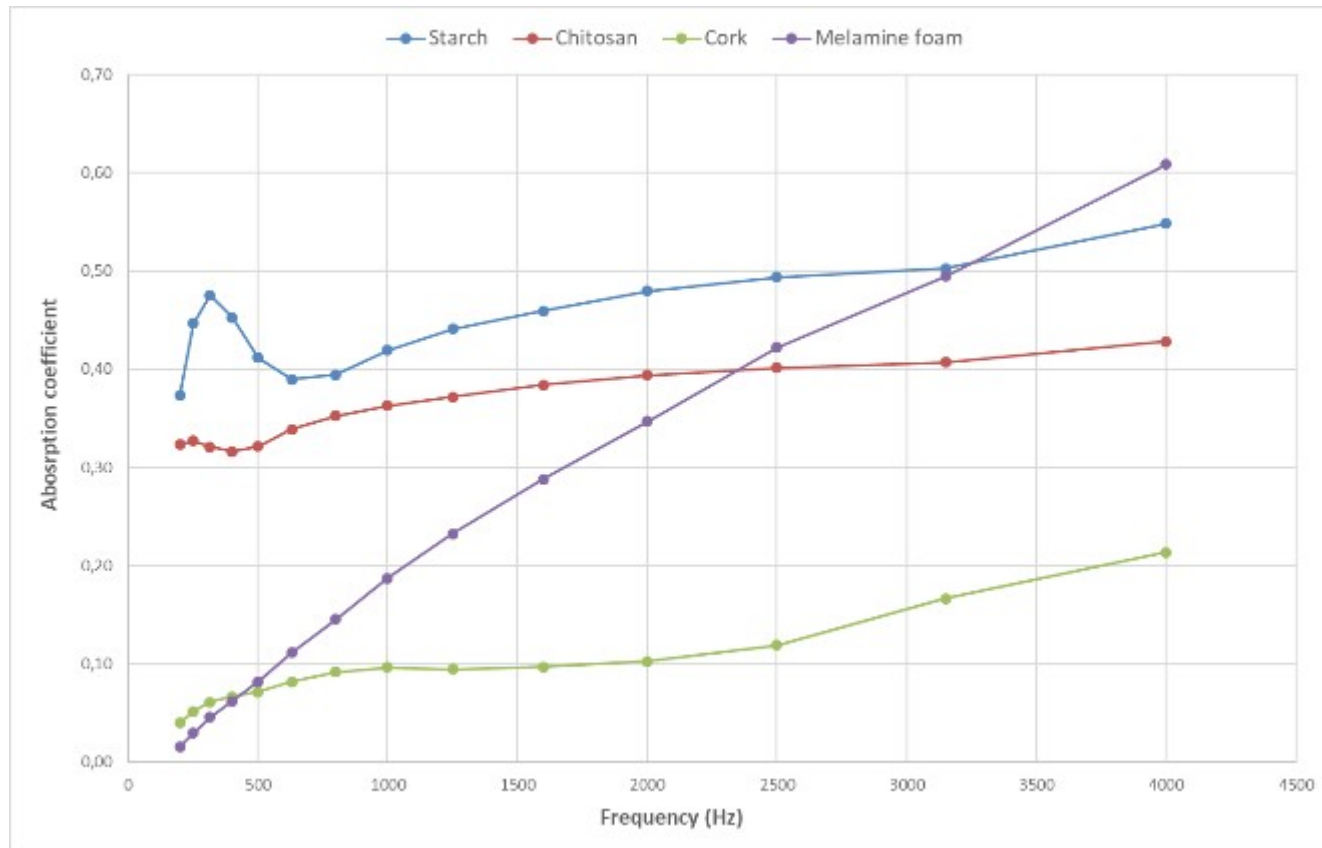
- Sunflower seeds are the only valorized part of sunflower.
- Stalk and other components are left at the field.
- Pith from inside the stalk has insulation properties.
- “Atelier Luma creates new and sustainable ways of using the natural and cultural resources of the bioregion. From agricultural waste recycling to the promotion of traditional craft...”



SUNFLOWER PITH PANEL PRODUCTION



TESTS FOR ACOUSTIC ABSORPTION



LCA MODELLING OF THE CASE STUDIES

- Consequential approach → system expansion → co-products are included in the system boundaries
- Agricultural systems → Land Use Change
- Carbon storage

FOR MORE INFORMATION

● **Articles for publication:**

(Under review at JCLP)

◆ **Flax Fiber for Technical textile: a life cycle inventory**

Alejandra Gomez-Campos, Claire Vialle, Antoine Rouilly, Caroline Sablayrolles, Lorie Hamelin

◆ **Natural Fibre Polymer Composites - A game changer for the aviation sector?**

Alejandra Gomez-Campos, Claire Vialle, Antoine Rouilly, Lorie Hamelin, Aline Rogeon, David Hardy, Caroline Sablayrolles