



BIO4EEB

WP6 – SOPHIA/STARCELL Contribution to TASK T6.3.4



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Posidonia and Rice Straw Insulating Panel – What is?

A compact panel made of **posidonia leaves** and **rice straw** held together by a **bio-based epoxy resin**



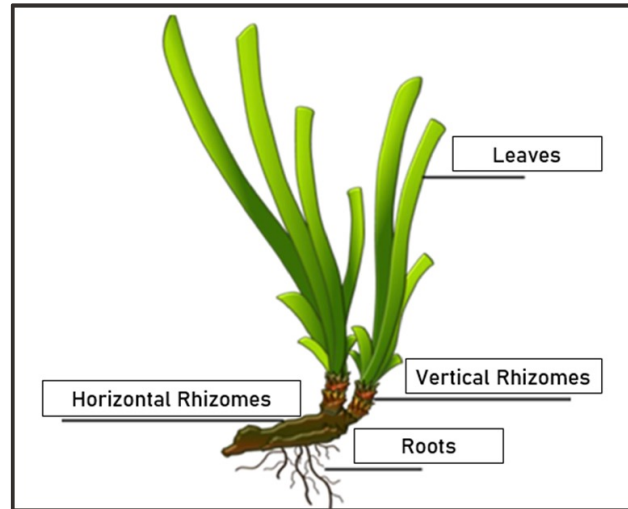
Posidonia and Rice Straw Insulating Panel – OCEANIC POSIDONIA

Posidonia oceanica is a seagrass species endemic to the Mediterranean Sea that forms vital underwater meadows, providing habitat for marine life, stabilizing sediments, improving water quality, and serving as a key carbon sink that helps combat climate change and coastal erosion.



Posidonia and Rice Straw Insulating Panel – OCEANIC POSIDONIA

One of the most notable phenomena of the plant is the formation of Posidonia banquettes—piles of decaying leaves along the shore. Although ecologically valuable, these accumulations can negatively affect tourism and local economies by making beaches less attractive due to their unsightly appearance and unpleasant odor.



Posidonia and Rice Straw Insulating Panel – RICE STRAW



Rice straw, once considered agricultural waste, is now recognized as a valuable resource for sustainable construction. Repurposed into products like insulating panels, it helps reduce waste and provides an eco-friendly alternative to synthetic materials.

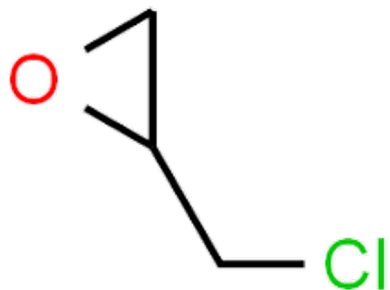
Posidonia and Rice Straw Insulating Panel – RICE STRAW

Rice straw, a by-product of rice harvesting, is often burned to clear fields, a practice that contributes to pollution and carbon emissions. Growing environmental awareness has led to efforts to repurpose this material for sustainable uses, such as insulation panels and biodegradable products.



Posidonia and Rice Straw Insulating Panel – BIO-BASED EPOXY RESIN

To give the panel the necessary mechanical properties for handling and installation, a resin is used to bind the fibers together—a common practice in the production of both synthetic and natural fiber panels. A bi-component epoxy resin with approximately 46% carbon from renewable sources is used, helping to reduce environmental impact.



Posidonia and Rice Straw Insulating Panel – PANEL CHARACTERISTICS

Compact, stable and durable product suitable to be integrated into several solutions for building insulation like façade, false wall and ceiling.



Posidonia and Rice Straw Insulating Panel – PANEL CHARACTERISTICS

The panels are produced by pressing the material in specially designed molds, after pre-mixing Posidonia leaves, rice straw, and resin into a homogeneous compound.



Posidonia and Rice Straw Insulating Panel – PANEL CHARACTERISTICS

The **mass ratio** between the fibers and the resin is **3:1**, but since the fibrous materials are very bulky and much less dense than the resin, even a small amount of resin is sufficient to produce panels covering several square meters.



Posidonia and Rice Straw Insulating Panel – PANEL CHARACTERISTICS

Since the panel is composed of three-quarters **natural fibers** and the resin used contains a minimum of **46% carbon from renewable sources**, the **bio-based content** of the panel is close to **87%**, making it a strategic solution for reducing environmental impact.

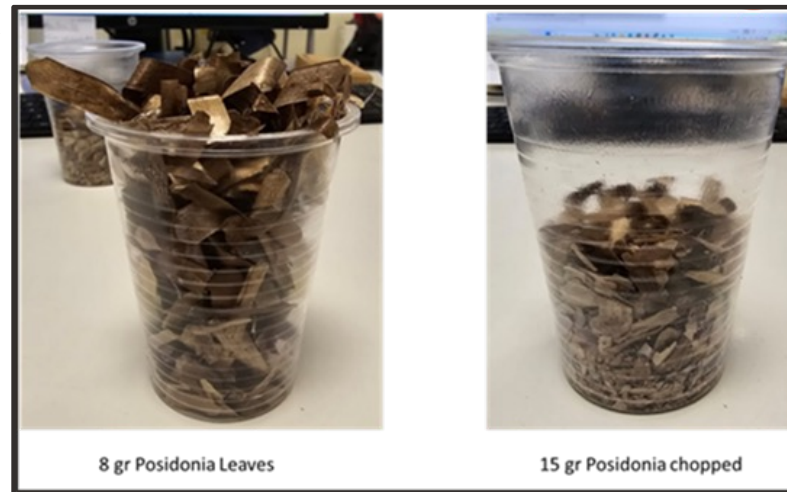


Posidonia and Rice Straw Insulating Panel – PANEL CHARACTERISTICS

Although it is possible to make a panel only with Posidonia, its characteristics can vary greatly

**WHY IS
NECESSARY TO
ADD RICE STRAW?**

Long leaves
Posidonia,
collected shortly after
washing ashore.
LOW DENSITY
GOOD STRUCTURE



Short and chopped
leaves Posidonia,
exposed to
weathering for a long
time.
HIGHER DENSITY
LOW STRUCTURE

Posidonia and Rice Straw Insulating Panel – PANEL CHARACTERISTICS

Full Posidonia Panel made of
long leaves that intertwine
with each other

**Low Density / Good
Structural Integrity**



60% Rice Straw – 40 % Posidonia

Low Density / Good Structural Integrity



Posidonia and Rice Straw Insulating Panel – PERFORMANCES

2 kind of products

Density [kg/m ³]	Fiber to Resin Ratio	Thermal Conductivity [W/mK]	Specific Heat [J/KgK]	Water absorption [%]	Compression Test Compression stress at 10% relative strain [kPa]
100	3:1	0,040 @ 5°C 0,042 @ 15°C 0,046 @ 25°C	1,85 kJ/kgK @ 10°C 2,02 kJ/kgK @ 30°C 2,23 kJ/kgK @ 50°C	37,8	13,8
150	3:1	0,044 @ 5°C 0,047 @ 15°C 0,051 @ 25°C	1,75 kJ/kgK @ 10°C 1,89 kJ/kgK @ 30°C 2,46 kJ/kgK @ 50°C	34	63,9

Posidonia and Rice Straw Insulating Panel – DIMENSIONS and THICKNESS

Different dimensions and thickness

- 450 x 450 mm
- 1000x1350 mm
- 1000x500
-

20 mm thickness



100 mm thickness



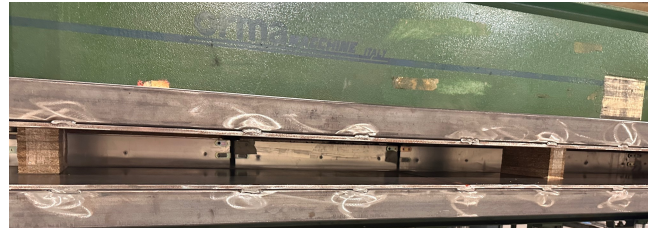
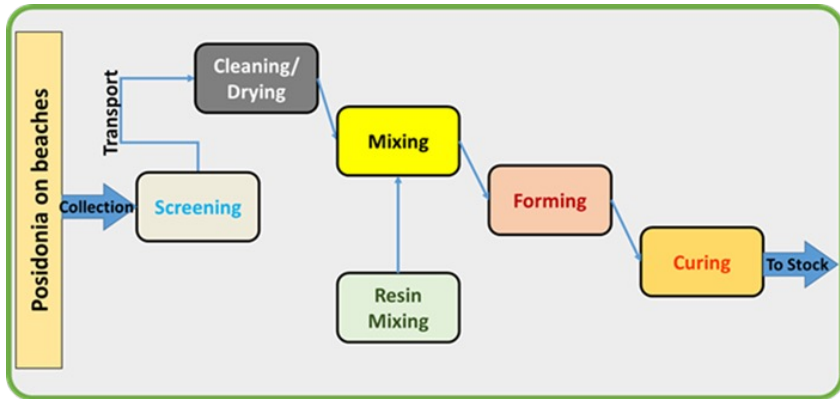
50 mm thickness



130 mm thickness

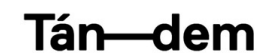


Posidonia and Rice Straw Insulating Panel – PRODUCTION PROCESS



Posidonia and Rice Straw Insulating Panel – PRODUCTION PROCESS

Insulating product	Density [kg/m ³]	Thermal Conductivity [W/mK]	Heat Storage Capacity [J/kgK]	Water absorption [%]	Compression stress at 10% relative strain [kPa]
Mineral Wool Panel (stone or glass)	50-200	0,032 - 0,053	800-1000	6	50
EPS Panel	20-25	0,033 - 0,039	1300 -1400	2	100
Polyurethane Panel	30 - 40	0,024 – 0,027	1200 -1400	2	150
XPS Panel	30-40	0,035 – 0,045	1300 - 1400	2	300
Hemp/kenaf panel	40 - 80	0,036 – 0,040	1600-1700	20	2-3
Rice Straw/Posidonia Panel 1	100	0,044	1950	37,8	13,8
Rice Straw/Posidonia Panel 2	150	0,049	1900	34	63,9



THANK YOU

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