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shRoom-Inn - The Future of Insulation

Main Points

Resource Resilience:

- addressing "Peak Oil" challenges
- improving resource diversity

Rethinking Resource Usage:

- shift to sustainability
- harnessing valuable materials from resources

Black Liquor Potential:

- utilizing lignin
- capitalize on carboxylic acids

Sustainability and Profit:

- waste conversion to valuable materials
- environmental responsibility achieved





Main Product

Insulation Boards

Mushroom-based:

pleurotus ostreatus

Insulation:

comparable with styrofoam [1,2]

Sustainability:

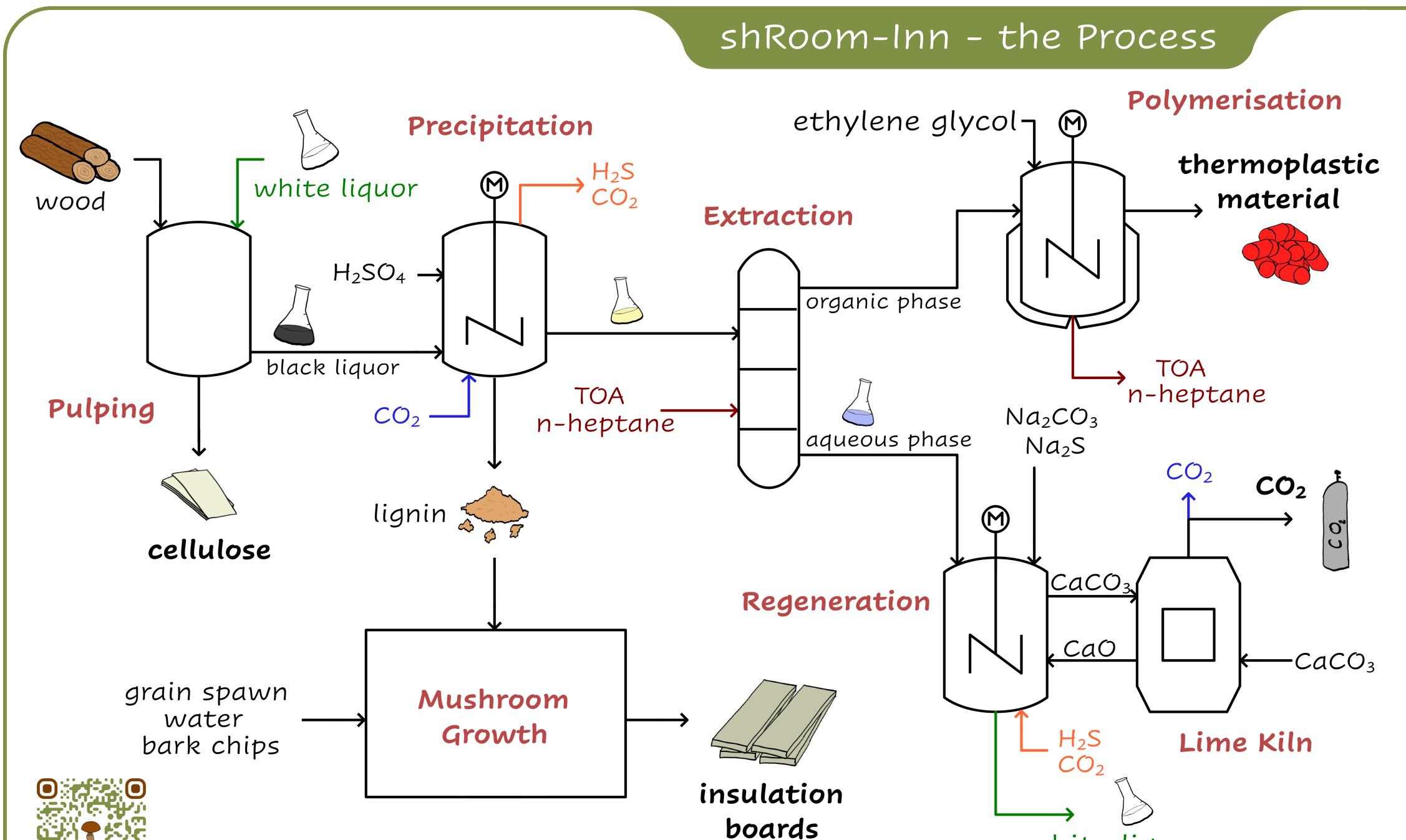
easy compostable from 100% natural resources

Production Capacity:

3.8 mil. std. boards per year standard board dimensions:

 $1.2 \times 0.6 \times 0.06 \text{ m}$

7.4 kg



Pulping:

with white wood breakdown liquor [3,4]

Precipitation:

lignin separation with pH-drop^[4]

Extraction:

carboxylic complexation of acids with TOA [5]

Regeneration:

pH and concentration adjustments of white liquor [3]

Lime Kiln:

process for pH adjustment [3,4]

Mushroom Growth:

cultivation of fungi [2,6]

Polymerisation:

linking of carboxylic acids to linear connectors

Economics

Initial Investment:

38.7 mil. € for facilities, land, and construction

Annual Revenue Breakdown:

achieving a turnover of 160.6 mil. €

Annual Costs:

116.3 mil. € consisting of personell expenses, material & electricity costs, disposal expenses, duties, and interest

Annual Profit:

due to sustainable, energy efficient, biodegradable boards, bio-thermoplastics, and CO₂

Break-Even Point:

achieved within the first year

Process Standard shRoom-Inn 8 . emissions carboi

white liquor

Environment

CO₂-Sink:

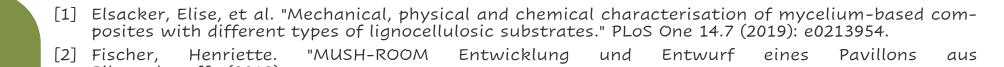
84% emission reduction, a significant stride for the environment

Rescource-Efficiency:

shifting from burning valuable materials to utilizing black liquor waste for valuable products

Enhanced-Approach:

holistic utilization of trees as a valuable resource: eco-friendly alternative to oil-based materials



[3] Pastusiak, Remigiusz. Charakterisierung von Zellstoffkomponenten. Diss. Technische Universität

^[4] Gordobil, Oihana, et al. "Impact of drying process on kraft lignin: Lignin-water interaction mechanism study by 2D NIR correlation spectroscopy." journal of materials research and technology 12 (2021): 159-169. [5] Núñez, Daniel, et al. "Recovery of organic acids from pre-treated Kraft black liquor using ultrafiltration and liquid-liquid extraction." Separation and Purification Technology 284 (2022): 120274.