Unlocking CBP’s Potential Through Value Addition, Innovation and the Circular Economy: The U.S. Experience

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Representing - National Cotton Council

Workshop on Cotton By-Products (CBP’s)
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Cotton Production and Processing Research Unit
Cotton by-products $\rightarrow$ Food, Fuel, & Material Feedstocks

- Feed
- Composites
- Fuel
- Turf

Food: ultra-low gossypol
Spindle-Picked – 36 to 50 kg/bale
Stripper Harvested – 136 to 300 kg/bale
Applications for Cotton Byproducts

- Feed (livestock)
- Fuel
- Soil & Turf- Geotextiles, Mulch/Compost (soil nutrients, fertilizer, vegetation establishment)
- Composites (acoustic absorbers, building materials, packaging, etc.)
- Other (“textilebio”, .....)
Feed for Livestock

Agricultural residues can be processed into a high energy roughage for ruminant livestock.
Fuel Source

Agricultural residues can be made into a fuel source for residential and industrial applications.
Soil & Turf Products

Agricultural residues can be made into products for erosion control & vegetative establishment.
Composites

Agricultural residues can be used as raw materials for various composite materials.
Primary Substrate – Ag. Biomass
Grown Packaging
Massive Structures
Design + Interiors
Benefits of Mycelium Composite
Biomedical Application?
GROWN, NOT GLUED

Myco Board

Myco Board combines the benefits of honeycomb and paper-based cores into one, more functional product. This core material can be made out of waste materials and is strong enough to hold furniture at any point, with superior strength to weight ratios compared to HDF. Myco Board can be grown into wood panels, entirely sustainable. And because its grown with agricultural waste and without synthetic resins, Myco Board is healthy for people, and better for our planet.

Flat Myco Board

Not only is Myco board healthier and lighter than HDF, it can also be molded into shapes. This means your product and process require only a few of the confines of a rectangle without generating the dust and waste of milling with CNC routers. This allows building in the same technology that powers our "soft-top" packaging platforms, and grows strong, durable and natural materials in almost any shape.

Performance Specifications

<table>
<thead>
<tr>
<th>Metric</th>
<th>Standard</th>
<th>Ecovative</th>
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<tbody>
<tr>
<td>Hardness/Strength</td>
<td>AS4/48MP</td>
<td>E000W</td>
</tr>
<tr>
<td>Density</td>
<td>AS7/64E</td>
<td>16.14E1</td>
</tr>
<tr>
<td>Moisture of Dryness</td>
<td>AS7/48MP</td>
<td>24.9D</td>
</tr>
<tr>
<td>Flexural Strength</td>
<td>AS7/48MP</td>
<td>15.4F</td>
</tr>
<tr>
<td>Screw W. Behavior</td>
<td>AS7/48MP</td>
<td>15.4F</td>
</tr>
<tr>
<td>Core Subject</td>
<td>AS7/48MP</td>
<td>25.4M</td>
</tr>
<tr>
<td>Fire Test Reserve</td>
<td>AS7/48MP</td>
<td>Class A</td>
</tr>
<tr>
<td>Formaldehyde emission</td>
<td>AS7/48MP</td>
<td>0.012 ppm</td>
</tr>
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Myco Board offers the best of both worlds: strength and stiffness, efficiency of material use, and a great building material in all kinds of furniture and construction. The technology is scalable and has been developed by Gunlocke® engineers and designers. It's an environmentally-friendly alternative to traditional materials and processes.
TextileBio


Grown in just 9 days

Website: EcovativeDesign.com
Does ULGCS Comprisise the Plants Natural Defense?

<table>
<thead>
<tr>
<th>Seed kernel</th>
<th>Magnified Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Cotton</td>
<td>Glandless Cotton</td>
</tr>
<tr>
<td>Seed Gossypol: 7,000 ppm to 10,000 ppm</td>
<td>Seed Gossypol: &lt;100 ppm</td>
</tr>
<tr>
<td>Insect Protected Foliage</td>
<td>No insect protection</td>
</tr>
</tbody>
</table>

- Regular Cotton: Seed Gossypol ranges from 7,000 ppm to 10,000 ppm, providing insec protection.
- Glandless Cotton: Seed Gossypol is less than 100 ppm, resulting in no insect protection.
- Engineered Cotton (ULGCS): Seed Gossypol is 250 ppm, offering insect protection.

The table illustrates the comparison of different cotton varieties in terms of seed gossypol content and their impact on insect protection.
Cottonseed Protein Value

- **Highest Value**: Human
- **Aquaculture**
- **Pets & Horses**
- **Pigs & Chickens**
- **Cattle**

**Highest Efficiency of Utilization**

**Lowest Efficiency of Utilization**

**Highest Value**

**Lowest Value**
Global Cottonseed Production
44 Million Metric Tons/Year
Producing 10 Million Tons of Protein
Enough to Satisfy the Daily Protein Needs of 600 million people
THANK YOU