Keynote Presentation

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Ecovative developed a polymer based on fungal mycelium. This entails an alternative polymer chemistry—closer to the assembly of tissues in animals than what is usually thought of as chemistry. Producing a product can start with less than 0.1% mycelium and grow to 25% of the material in 96 hours.

Using this technology, the company has developed products for building insulation, product packaging, automotive composites, and engineered wood. They have demonstrated that they are able to grow the structure and insulation for a small house.

Ecovative has been recognized as a "Tech Pioneer" by the World Economic Forum and recently won the

Buckminster Fuller challenge for socially responsible design.

Opportunities for Safer Chemicals and Products

- Fungi offer a good value proposition for performance, cost, and sustainability. However, they have been totally ignored as a system for innovation. Because it is a living polymer, the morphology can be changed with different environmental conditions.
- Numerous applications are waiting to be developed. The technology is being licensed to promote a new platform that many industries can use.
- Existing infrastructure can be utilized in some cases. To create automotive composites, they impregnate mats made from natural fibers, such as hemp, with mycelium. This process can use the same presses already used in the industry.
- Properties can be modified. For example, automotive composites can be chemically changed from hydrophobic to hydrophilic.
- Fungi can be used to replace chemical adhesives. Adhesive costs for making traditional plywood have increased dramatically from the 1960s when it was about 3% of the cost. It is now 20 to 40% of the cost. Plywood can be made with fungi instead of chemical adhesives. Plywood manufacturers that use this technology could realize substantial cost savings.

Key Drivers

- The products help to meet the growing demand for safer alternatives to styrene and for climate-friendly materials.

Challenges for Implementation

- Initial investment. Their first product was an insulation material for buildings. They had difficulties raising capital to commercialize it -- investors would laugh at them. Then they won a global competition for the best green technology to address climate change. Their prize of a half million euros gave them funding to begin commercialization.
- New infrastructure is needed in some cases. The mycelium system often requires new production processes and infrastructure all along the supply chain. This can be a long term project.
- Phobias about fungus and microbes. The fungus they use does not produce spores. Honest, factual communication has been key to overcoming such fears.

Helpful actions to advance green chemistry (e.g. policies, education, partnerships)

- Government funding programs. Significant funds were needed to conduct the necessary scientific research. New York State provided the first funds. Those funds gave the company the ability to raise capital. The company has also received funds from the EPA, NSF, and USDA.
- Changing codes and regulations. The company can build tiny houses in which the mycelium grow inside the walls to provide insulation and structure without needing studs. However, building codes are incredibly restrictive and can block such innovative technologies.