Biodegradable Composite Materials for the Building Industry

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Objectives

- Investigate composite materials made from natural, renewable materials
- Investigate breakdown of bio-composites as an energy source
- Examine mechanical performance of bio-composites for structural and non-structural applications
- Identify potential uses and barriers of bio-composites in the building industry

Description of Research

Our goal is to develop alternative materials for the building industry that will (1) reduce energy costs and pollution from material production and (2) have greater resource potential after demolition. We are currently investigating bio-composite materials, which consist of natural-based resins and fibers. Stronger, man-made fibers could also be used to meet the objectives of bio-composite use if the fibers can be recycled or reused.

Resins for bio-composites can be derived from 3 different sources. They can be composed of polymers that occur naturally (e.g. starch), polymers made by fermentation (e.g. PHBV) or polymers from naturally occurring monomers (e.g. triglycerides). We are currently investigating the properties of resins derived from soybean oil. These resins will be combined with natural fibers such as ramie, hemp, jute or flax to make bio-composites. Biodegradability and mechanical properties are being determined from a series of experiments.

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