Exploring new uses for agricultural materials to create green products

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Work with the leaders in biorenewables research and development

PROFILE
The Biopolymers & Biocomposites Research Team promotes research and development of biorenewable polymers and composites from agricultural crops, encourages bioplastics in industry, and works toward new formulations and processing techniques. The team’s main objective is the development of new formulations and processing techniques for cost effective biopolymers and biocomposites that perform to industry standards.

CAPABILITIES
Our team is comprised of highly skilled researchers from diverse backgrounds including agricultural and biosystems engineering, architecture and design, chemical engineering, chemistry, materials science, and natural resource ecology and management. This diversity helps us be more innovative in the development of new products.

FACILITIES
Our facilities focus on product development, characterization, and scale-up. Lab space includes a full range of thermal analysis and mechanical characterization services. Pilot plant space includes 3,000 square feet for industrial products processing. The pilot plant equipment includes a plastic film and sheet extruder, compression and injection molding machines, and mechanical testing equipment. Our researchers also have access to and expertise in small angle x-ray and neutron scattering for in situ nanoscale structural characterization.

POLYMERIZATION OF RENEWABLE OILS
Research is focused on using renewable oils such as soybean, corn, and linseed oils to create biobased polymers. Coatings, films, adhesives, plastics, and resins have been developed and tested.

These new polymers could be used in furniture, automobiles, electronics, fiber optics, and much more.

PROTEIN-BASED PLASTICS
Corn and soy-based protein plastics are being developed as an alternative to petroleum-based plastics. They are biorenewable and biodegradable. These plastics can be molded into any shape and used with existing equipment. Mechanical properties are similar to petroleum-based plastics. Possible applications include home and garden supplies, toys, building materials, and industrial packaging.

PROTEIN-BASED ADHESIVES
Non-toxic, environmentally friendly soy-based adhesives have been developed that could eliminate or drastically reduce the need for formaldehyde-based resins. The adhesives are made from soy flour, a renewable and biodegradable source. These adhesives could be used in construction materials and furniture applications.

CELLULOSIC-BASED COMPOSITES
A range of new biocomposites have been prepared from natural oils, resins, and fillers as diverse as glass fibers, clay, and agricultural co-products such as spent germ, corn stover, and soybean hulls.

Potential uses for biocomposites include electronics, shower stalls, corrugated and flat paneling, hog feeders, and underhood applications in cars.
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