Biomass Program

Chemicals from Oilseeds

Seed oils have long been used in chemicals and materials such as surfactants, detergents, lubricants, and to a limited degree as plasticizers in polymers. However, high feedstock and processing costs have put vegetable oils at a disadvantage when compared to petrochemical feedstocks. These barriers must be overcome for oilseed-based materials to be cost- and performance-competitive with materials derived from conventional petrochemical feedstocks.

The Dow Chemical Company and its collaborators are conducting research in the areas of plant science, crop production, processing, and product utilization to optimize the production of novel chemicals and plastics from oilseeds. This project will focus on developing the castor plant as a suitable oilseed.

R&D Pathway

Plant Science: Genetically engineer castor plant to produce the desired specialty fatty acids in the oilseed at high levels, and improve agronomic traits through conventional breeding.

Castor seed pods

Crop Production: Develop integrated local systems for the production, handling, and processing of castor to facilitate the adoption of the crop by farmers.

Processing: Develop improved separation technologies and new processing methods, including catalysis, to convert the fatty acids into useful intermediates.

Utilization: Partner with industry end-users to rigorously test the final products. Determination of the materials' functional properties will help researchers understand the relationship between the fatty acid structures and the material function properties and lead to fine-tuning of the feedstock fatty acid composition.

Bioproducts R&D

Benefits

- **Develop novel, oilseed-based polymers**
- **Reduce dependence on foreign oil for chemical feedstocks**
- **Boost the rural economy by developing a high-value, industrial crop for marginal dry land areas**

Applications

This research will develop the technologies for establishing a castor oil biorefinery, and the knowledge gained will be applicable to developing or improving other oilseeds for use as an industrial feedstock.

Project Partners

The Dow Chemical Company
Castor Oil, Inc.
USDA-ARS Western Regional Research Center

Project Period

FY 2002 – FY 2006

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