PLANT OIL-BASED REACTIVE DILUENTS FOR COATING AND COMPOSITE APPLICATIONS
(RFT-438)

Invention Summary:

NDSU scientists have developed plant oil-based reactive diluents for coating and composite applications that possess both low viscosity and high reactive functionality. With these improved characteristics, these plant oil-based materials eliminate or reduce the need to be blended with petrochemicals thereby increasing the bio-based content of the product, which is environmentally more desirable. The fundamental aspect of the invention involves trans-esterification of a plant oil triglyceride with an alcohol that also contains at least one double bond. By completely replacing the glycerol component of the plant oil triglyceride with three equivalents of the unsaturated alcohol, fatty acids esters are produced containing at least one double bond that is not derived from the parent plant oil. Depending on the application requirements, a low-cost, bio-based unsaturated alcohol can be used to produce the reactive diluents of the invention.

Soybean oil was used in this research sponsored by the United Soybean Board

Applications:

- Radiation/UV curable coatings and inks
- Thermoset composites
- Industrial coatings for furniture, films, flooring, and plastics

Benefits:

- Eliminates the need for solvent
- Low viscosity
- High reactive functionality enables coatings and composites with relatively high modulus/hardness/scratch resistance
- Enables VOC-free compositions with very high renewable content
- Non-toxic and biodegradable

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Patents:

This technology is the subject of US Issued Patent No. 9,834,626 and is available for licensing/partnering opportunities.

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