Energy and Bioproducts

PHOTO: Maryland Agricultural Experiment Station

Land-grant university research creates sustainable domestic products from agricultural waste and biomass

Petroleum and other nonrenewable materials are widely used for daily products, but many of these items can be made from biomass, including food and agricultural wastes. Bioproducts enhance energy, food and national security while reducing fossil fuel reliance and emissions. They also create jobs, boost the economy, provide farmers with extra income and reduce harmful disposal methods.

Here are a few examples of that work:

- Researchers from **Pennsylvania** demonstrated that biochar produced from cotton gin waste and walnut shells could remove common pharmaceuticals that are difficult to fully remove in wastewater treatments. These biochars could serve as cost-effective, environmentally friendly alternatives to activated carbon for removing common drugs from water supplies. *Pennsylvania Agricultural Experiment Station; Hatch Multistate. See full statement.*
- A research team in **Iowa** found that corn cobs performed better than commonly used woodchips in bioreactors that remove nitrates from agricultural wastewater. The team is continuing to test other potential carbon sources that are readily available in the Midwest. *Iowa Agriculture and Home Economics Experiment Station; Other USDA Competitive, State Appropriations. See full statement.*
- In **Indiana**, researchers and engineers are testing physical and chemical properties of corn residues, informing equipment manufacturers how they can more efficiently and reliably convert agricultural waste into renewable, low-carbon products. *Purdue University Research; Hatch. See full statement.*

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The National Land-grant Impacts Database (NIDB) documents the individual and collective impacts of the national Land-grant University System of joint research, education and Extension. Much of this work is supported by capacity and competitive funds through the USDA's National Institute of Food and Agriculture.

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- Working with local producers and industry partners at Delta Airlines and Cargill, researchers in **Minnesota** are exploring ways to integrate regenerative agricultural practices with cutting-edge technologies to develop a sustainable aviation fuel derived from winter camelina, which can be grown as a cover crop. This solution could help improve water and soil conservation while also opening new economic opportunities for farmers. *Minnesota Agriculture Experiment Station; Non-Profit Grants & Contracts. See full statement.*
- Extension professionals in **Alaska** collaborated with researchers in **Utah** and Western Sustainable Agriculture Research and Education to demonstrate biochar practices for Alaskan communities rich in wood resources but off the road system. Because biochar is low-tech and can be created by anyone, it provides Alaskan growers with more accessible, locally derived soil amendments and reduces reliance on expensive fertilizers. *University of Alaska Fairbanks Cooperative Extension Service, Utah State University. See full statement.*
- A team of **Maryland** researchers conducted experiments to understand the impacts of different organic waste products such as mulch, compost and biosolids on soil chemistry, fertility and suitability for plant growth. Their findings are providing important science-based recommendations for the use of recycled organic materials to help reduce waste and keep organic material out of landfills where it rots and emits methane and carbon dioxide. *Maryland Agricultural Experiment Station. See full statement.*