

Bioasphalt to be used, tested on Des Moines bike trail

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Crews cover part of a Des Moines bike path with a mix of Bioasphalt developed by Iowa State University's Christopher Williams. Williams and his research team will monitor the path to see how it stands up to Iowa's weather. Credit: Photo by Mike Krapfl/Iowa State University

Iowa State University's Christopher Williams was just trying to see if adding bio-oil to asphalt would improve the hot- and cold-weather performance of pavements. What he found was a possible green replacement for asphalt derived from petroleum.

That finding recently moved from Williams' laboratory at the Institute for Transportation's [Asphalt](#) Materials and Pavements Program at Iowa State to a [demonstration project](#). The project paved part of a Des Moines bicycle trail with an asphalt mixture containing what is now

known as Bioasphalt.

If the demonstration and other tests go well, "This would be great stuff for the state of Iowa," said Williams, an associate professor of civil, construction and environmental engineering.

He said that's for a lot of reasons: Asphalt mixtures derived from plants and trees could replace petroleum-based mixes. That could create a new market for Iowa [crop residues](#). It could be a business opportunity for Iowans. And it saves energy and money because Bioasphalt can be mixed and paved at lower temperatures than conventional asphalt.

Bio-oil is created by a thermochemical process called fast pyrolysis. Corn stalks, wood wastes or other types of biomass are quickly heated without oxygen. The process produces a liquid bio-oil that can be used to manufacture fuels, chemicals and asphalt plus a solid product called biochar that can be used to enrich soils and remove greenhouses gases from the atmosphere.

Robert C. Brown – an Anson Marston Distinguished Professor of Engineering, the Gary and Donna Hoover Chair in Mechanical Engineering and the Iowa Farm Bureau director of Iowa State's Bioeconomy Institute – has led research and development of fast pyrolysis technologies at Iowa State. Three of his former graduate students – Jared Brown, Cody Ellens and Anthony Pollard, all December 2009 graduates – have established a startup company, Avello Bioenergy Inc., that specializes in pyrolysis technology that improves, collects and separates bio-oil into various liquid fractions.

Williams used bio-oil fractions provided by Brown's fast pyrolysis facility at Iowa State's BioCentury Research Farm to study and develop Bioasphalt. That research was supported by the Iowa Energy Center and the Iowa Department of Transportation.

Avello has licensed the Bioasphalt technology from the Iowa State University Research Foundation Inc. and has produced oak-based bio-oil fractions for the bike trail project using funding from the Iowa Department of Economic Development. Williams said the project will include a mix of 5 percent Bioasphalt.

Jeb Brewer, the city engineer for the City of Des Moines, said the Bioasphalt will be part of phase two of the Waveland Trail on the city's northwest side. The 10-foot-wide trail will run along the west side of Glendale Cemetery from University Avenue to Franklin Avenue.

Brewer said the demonstration project is a good fit for the city.

"We have a fairly active program for finding ways to conserve energy and be more sustainable," he said. "We're interested in seeing how this works out and whether it can be part of our toolbox to create more sustainable projects."

Contractors involved in the Bioasphalt demonstration project are Elder Corp. of Des Moines, Bituminous Materials and Supplies of Des Moines and Grimes Asphalt and Paving Corp. of Grimes with the Asphalt Paving Association of Iowa supporting the project.

Iowa State's Williams said a successful demonstration would lead to more pavement tests containing higher and higher percentages of Bioasphalt.

"This demonstration project is a great opportunity," he said. "We're introducing a green technology into a green environment in Des Moines. And it's a technology that's been developed here in Iowa."

Provided by Iowa State University

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