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BETTER BIOFUEL PRODUCTION METHODS

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5-hydroxymethyl furfural may not roll easily off the tongue, but this carbon-neutral, renewable material offers a promising alternative to fossil fuels. Commonly referred to as HMF, it can be readily converted into a bio-oil with properties very similar to petroleum. And unlike many biofuels, it can be produced from organic waste rather than food crops, taking the pressure off food prices.

The problem? Current methods of generating HMF from waste material are expensive, technically challenging, and often toxic.

Enter UW's Zhongchao Tan. Together with colleagues from the University of Calgary, Tan has been refining the process of producing HMF using hydrothermal conversion, heating an aqueous solution of biomass in order to transform cellulose into the valuable fuel. By experimenting with a variety of temperatures, reaction times and pH levels, the researchers discovered that a relatively strong acidic solution slowly heated to under 300 degrees Celsius for less than 30 minutes produces HMF with high purity and yield.

These results prove that wet organic waste can be converted to quality biofuel with high efficiency and low cost. Ultimately, hydrothermal conversion could offer a viable technique for turning material like woodchips, straw, manure and even municipal waste into green fuel sources.

Partners: The Alberta Agricultural Research Institute