

Turning wood into pharmaceutical ingredients

October 23 2019



Credit: American Chemical Society

Production of hazardous waste during drug manufacturing is a serious concern for the pharmaceutical industry. Typically, large amounts of flammable solvents are used during these processes, which usually require several steps to make structurally complex drugs. Researchers now report in the journal *ACS Central Science* a method to produce pharmaceutically relevant compounds in just two or three steps, with water as the only waste product, using renewable woodchips as starting material.

The process takes advantage of the [lignin](#) component of [wood](#). Lignin consists of cross-linked phenolic compounds that give wood its strength. During paper production, it is removed from wood to prevent the resulting paper from yellowing, and, counterintuitively, to increase the

strength of the paper. This process generates a huge amount of unwanted lignin, so researchers have been studying ways to repurpose the material for many years.

While several groups recently developed strategies for depolymerizing lignin, the big question remained: What kind of useful products could be obtained from it? Katalin Barta and colleagues realized that, coincidentally, lignin derivatives share many complex structural features with modern pharmaceuticals, making them ideal starting materials to synthesize potential drug candidates. By exploiting this natural bounty, they could skip the typically laborious and waste-generating steps traditionally needed to create these drugs from petrochemicals.

The team focused on a class of pharmaceuticals known as benzazepines, which include the anti-anxiety [drug](#) diazepam. The conventional multistep synthesis using flammable solvents generates roughly equal amounts of waste and benzazepines. But the researchers' new process uses catalytic methods, in combination with solvents that are nontoxic, recyclable and biodegradable, to convert monomers derived from lignin into benzazepine derivatives without producing waste. Several of the new compounds show promising antibacterial or anticancer activity in bacterial and human cells

More information: Saravanakumar Elangovan et al. From Wood to Tetrahydro-2-benzazepines in Three Waste-Free Steps: Modular Synthesis of Biologically Active Lignin-Derived Scaffolds, *ACS Central Science* (2019). [DOI: 10.1021/acscentsci.9b00781](https://doi.org/10.1021/acscentsci.9b00781)

Provided by American Chemical Society

Citation: Turning wood into pharmaceutical ingredients (2019, October 23) retrieved 27 April

2024 from <https://phys.org/news/2019-10-wood-pharmaceutical-ingredients.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.