

# Alternative uses for cannabidiol bioproducts

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Emilie Kohler holds a flask of extractives from hemp. Credit: Krista Timney

The cannabidiol industry is booming. Produced by extracting non-psychoactive oils from hemp, the product is increasingly gaining acceptance as an alternative treatment to numerous health challenges.

Virginia Tech researchers may have found another use: a way to make

plywood stronger.

This past summer, undergraduate Emilie Kohler of the College of Natural Resources and Environment researched the possibility of utilizing one byproduct of the cannabidiol extraction process—the jelly-like pectin that exists in the cell walls of most plants—as a modifying agent in the production of wood-based materials such as plywood and structural composite lumber.

"Pectin is typically used in jellies and jams, because it has a natural tendency to form a gel which doesn't flow," said Kohler, a senior majoring in sustainable biomaterials science. "I'm isolating pectin from hemp to analyze the flow properties to see if they can be used as a modifier in wood adhesives."

Chip Frazier, the Thomas M. Brooks Professor of Sustainable Biomaterials in the Department of Sustainable Biomaterials and director of the Wood-Based Composites Center at Virginia Tech, indicated that the hemp industry is offering new avenues for researchers looking for alternative biological materials.

"Currently, the industry generates large quantities of solvent-extracted hemp flower, and all of that biomass is treated as waste, so it couldn't be cheaper for us as a raw material," explained Frazier, who supervises Kohler's research. "They produce polygalacturonic acids, which have an unusual chemical structure, and I had the idea to check their behavior in the production of wood products."

While the results of the research are still being determined, Kohler noted that the hemp pectin showed promise.

"Pectin can be categorized as high methoxyl or low methoxyl pectin,"

said Kohler, a recipient of the college's Victor Clay Barringer Endowed Scholarship. "Higher methoxyl pectin is used in jellies or jams because the sugar content allows it to gel. Lower methoxyl pectin, like those found in hemp, tend to gel with calcium ions, which are more common in adhesives."

Kohler, who is from Yorktown, Virginia, said that she found her way to the field of sustainable biomaterials by chance.

"In [high school](#), I liked chemistry and environmental science, and when I was researching colleges and universities, I saw this listed and didn't know what it was about. But when I got into classes I fell in love with the subject."

Frazier, who is Kohler's assigned mentor, credits her commitment to a challenging major.

"Emilie is one of the few students who has taken the science track in sustainable biomaterials," he noted. "It is heavy in chemistry, so she was particularly well-qualified to take on this research. She is very enthusiastic and very capable, and she's done a great job."

For Kohler, a summer of isolating [pectin](#) was an opportunity to gain a greater appreciation for the field of sustainable biomaterials, while having the chance to contribute research in an emerging area.

"Working with Dr. Frazier has opened my eyes and really taught me how to think about things on a deeper level," she said. "And it's exciting to work in such a new subject: not a lot of research has been done on [hemp](#), and this could be the start of something important."

Provided by Virginia Tech

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