

OSU Researchers Discover New Adhesive For Tape, Label Industry

EurekaAlert

CORVALLIS, Ore. - An incidental discovery in a wood products lab at Oregon State University has produced a new pressure-sensitive adhesive that may revolutionize the tape industry - an environmentally benign product that works very well and costs much less than existing adhesives based on petrochemicals.

The new adhesive can be produced from a range of vegetable oils, and may find applications for duct tape, packaging tape, stick-on notes, labels, even postage stamps - almost any type of product requiring a pressure-sensitive adhesive.

There are thousands of pressure-sensitive tape products, and analysts say it's a \$26 billion global industry.

The discovery was made essentially by accident while OSU scientists were looking for something that could be used in a wood-based composite product - an application that would require the adhesive to be solid at room temperature and melt at elevated temperatures.

For that, the new product was a failure.

"We were working toward a hot-melt composite adhesive that was based on inexpensive and environmentally friendly vegetable oils," said Kaichang Li, a professor of wood science and engineering in the OSU College of Forestry. "But what we were coming up with was no good for that purpose, it wouldn't work."

"Then I noticed that at one stage of our process this compound was a very sticky resin," Li said. "I told my postdoctoral research associate, Anlong Li, to stop right there. We put some on a piece of paper, pressed it together and it stuck very well, a strong adhesive."

Shifting gears, the two researchers then worked to develop a pressure-sensitive adhesive, the type used on many forms of tape, labels, and notepads.

"It's really pretty amazing," Li said. "This adhesive is incredibly simple to make, doesn't use any organic solvents or toxic chemicals, and is based on vegetable oils that would be completely renewable, not petrochemicals. It should be about half the cost of existing technologies and appears to work just as well."

There have been previous attempts to make pressure-sensitive adhesives from vegetable oils, Li said, but they used the same type of polymerization chemistry as the acrylate-based petrochemicals now used to make tape. They didn't cost much less or perform as well, he said.

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The new approach used at OSU is based on a different type of polymerization process and produces pressure-sensitive adhesives that could be adapted for a wide range of uses, perform well, cost much less, and would be made from renewable crops such as soy beans, corn or canola oil, instead of petroleum-based polymers.

The technology should be fairly easy to scale-up and commercialize, Li said.

"OSU has applied for a patent on this technology, and we're looking right now for the appropriate development and commercialization partner," said Denis Sather, licensing associate with the OSU Office of Technology Transfer. "We believe this innovation has the potential to replace current pressure-sensitive adhesives with a more environmentally friendly formulation at a competitive price."

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