



Oregon State Conducts Research on Poplar Fibers

We already have fabrics made from hemp, bamboo, soy and seaweed. But now there's another new fiber generating buzz. Oregon State researchers are very optimistic about the performance characteristics of poplar fibers, which can be a sustainable and environmentally friendly alternative to synthetic bulk textile insulation fibers. Poplar seed hair fibers have been found to provide better thermal insulation than wool and hollow polyester.

Hsiou-Lein Chen, associate professor of Design & Human Environment at Oregon State University, is encouraged by recent tests she has conducted on poplar fibers. She explains, "I am interested in the development, testing, and applications of textile materials with special functions that can be used to improve human comfort and health. I am particularly interested in poplar fibers, which are also environmentally friendly and sustainable."

Dr. Chen's research began in 2003, when she was contacted by a company in Germany to perform fiber characterization tests on the



Popular Poplar: Hollow poplar fibers under a scanning electron microscope and fruit on a poplar tree branch.

seed hair fibers from poplar trees grown in Oregon. The company was interested in importing the poplar seed hair fibers from Oregon for the production of textile insulation products, such as comforters.

"While conducting the tests, I was intrigued by the unusual features of the seed hairs from the poplar trees," Dr. Chen notes. "These hairs have large hollow cores, and are soft, fine, and extremely lightweight, which makes them ideal for textile thermal insulation applications."

There are many advantages for using poplar trees as a resource. They are among the most widely grown trees worldwide, including the U.S. The genus *Populus*, which includes poplars, cottonwoods, and

aspens, is a useful source of wood and can grow in locations that are not suitable for many other crops. The trees are also useful for soil decontamination and erosion control.

Poplar fibers are made from the seed hairs that are attached to the seeds. Blooming from the poplar branch, the seed along with its attached hair fibers are encased in a fruit similar to a cotton boll. As a natural by-product of fast-growing trees, the seed hair fibers represent a renewable source, are non-polluting, require only mechanical cleaning before use, and are biodegradable.

Working along side her colleague, Dr. Brigitte Cluver, manager of the Textile/Apparel Performance Testing Laboratory at Oregon State, Dr. Chen conducted preliminary studies on poplar fibers, which measured the physical structure, fill power, watability, and thermal insulation qualities to assess the potential for using these fibers as bulk textile thermal insulation. Targeted end-use applications for poplar fibers include comforters, sleeping bags, and filling materials for clothing.

Results of the testing showed that the poplar seed hair fibers have a very fine fiber diameter (8-12 microns) with a large hollow core in relation to its diameter. The fiber qualities provide a soft hand, bulk retention, wet resistance, machine washability, and sustainability. According to Dr. Chen, the major downside of poplar fibers is that they are very short (3/8"-5/8") and therefore not suitable for yarn spinning and fabric construction. Also, because poplar trees are tall (a minimum of 10 feet), the harvesting of poplar fruits from the seed hairs also present some challenges.

Looking ahead, Dr. Chen sees a legitimate commercial future for poplar fibers. She states, "In 2006, poplar seed hair fiber was chosen as the Fiber of the Year in Germany. Now, a company in Germany is selling comforters using 100 percent poplar fibers, or a blend of poplar and other natural insulating fibers such as wool and camel."

For more information on the testing of poplar fibers, contact Ian Hsiou-Lien Chen, Oregon State University, 541-737-0996, Hsiou-Lien.Chen@oregonstate.edu. ●

Hairs are soft and light with large hollow cores.

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