Isolation of Antitermitic Compound-Producing Endophytes from Western Red Cedar (WRC) and Port-Orford Cedar (POC)

Liqin Sun, Chung-Yun Hse, Todd F. Shupe, and Kai Zhao

Abstract

Environmental disposal concerns have limited the use of many wood preservatives. Thus, interest in the development of alternative, environmentally-benign preservatives has intensified. This preliminary study evaluated the possibility that secondary metabolites produced by endophytic fungi of naturally durable trees may serve as viable alternatives to currently used termiticides. More than 140 endophytes were obtained from Eastern red cedar (Juniperus virginiana) and Port Orford cedar (Chamaecyparis lawsoniana). In addition, more than 20 endophytes were also obtained from the gut of Formosan termites (Coptotermes formosanus), and based on their cellulosic degradating activities, a bacteria (Bacillus spp.) and a fungus (Acrogenospora spp.) were selected from the termite gut endophytes as index strains for screening the inhibitory activities of the tree endophytes using agar diffusion assay. Based on our preliminary results, two endophytes from Port Orford cedar and two from Eastern red cedar were chosen for the study. HUB-I-011 showed the strongest inhibitory activities to white-rot fungi (TV) and brown-rot fungi (GT). Further test showed inhibitory activities of HUB-I-011 against white-rot fungi and brown-rot fungi significantly increased from 2.5% and 2.0% concentration, and feeding live termites test was in progressing. This is the first time to show antitermitic activities on endophytes isolated from natural resistance trees.
The 2013 Advancements in Fiber-Polymer Composites: Wood Fiber, Natural Fibers, and Nanocellulose conference seeks to bring together industry, government, and academia to discuss the latest developments in fiber-polymer composites and represents an evolution of the International Wood and Biofiber Plastic Composites conference series initiated by FPL and the University of Toronto, and hosted biennially by FPL and the Forest Products Society. This conference is the premiere conference in North America covering topics relating to wood-plastic composites, an important and growing segment of the forest products industry.

In addition, the conference covers the new field of nanocellulose composites. This advanced field will pave the way for new and enhanced forest products, including expansion into non-traditional markets. We invite you to come to Milwaukee, Wisconsin, USA from May 6-7, 2013 to share and learn about the state-of-the-art trends and perspectives on what the future holds in this dynamic field of fiber-polymer composites.
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Presenter: Liqing Sun, Graduate Student, Louisiana State University
Chung-Yun Hse, Principal Wood Scientist, USDA Forest Service, Southern Forest Research Station; Todd F. Shupe, Professor, School of Renewable Natural Resources, Louisiana State University; Kai Zhao, Associate Professor, Key Laboratory of Microbiology, College of Life Science, Heilongjiang University

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Sheldon Q. Shi, Associate Professor, University of North Texas; Xiumei Mo, Biomaterials and Tissue Engineering Laboratory, College of Chemistry and Chemical Engineering and Biological Engineering, Donghua University