

**Inventors:**


*Dr. Zhibua Jiang*

Assistant Professor,  
 Chemical Engineering  
 Director  
 Alabama Center for Paper &  
 Bioresource Engineering



*Dr. Burak Aksoy*

Assistant Research Professor  
 Department of Chemical  
 Engineering

**Contact:**

Brian Wright  
 Auburn University  
 Innovation Advancement &  
 Commercialization  
 334-844-7962  
[dircomm@auburn.edu](mailto:dircomm@auburn.edu)  
[iac.auburn.edu](http://iac.auburn.edu)  
 Reference: Phenol Additive

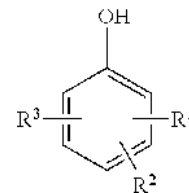


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## Cost Effective Additives In Kraft Pulping

*Auburn University is seeking a licensee or development partner for a cost effective additive that improves the effectiveness of kraft pulping of lignocellulosic materials.*

**Overview:** The kraft pulp process produces a high-strength pulp that is used in a number of consumer products, such as paper, tissues, and coffee filters. This new method improves the effectiveness of kraft pulping of lignocellulosic materials with the addition of cost effective phenols, such as xylenol. These additives can reduce lignin content and enhance yield.


**Advantages:**

- **PERFORMANCE** - Improves kraft pulping performance by lowering lignin content (reduced Kappa number) and increasing yield.
- **LOW IMPACT** - The additives are commercially available and cost effective, and do not require modifications to equipment or processes.
- **ENVIRONMENT** - Compounds have good safety and environmental profiles, unlike alternative additives such as anthraquinone.

**Description:** The removal of lignin, or delignification, is a crucial step in the paper making process as high residual lignin content leads to low quality end products. Lignin condensation reactions have frequently been cited as the most probable reason for the difficulty of eliminating residual lignin in kraft pulps. With this approach, phenols are used to help disrupt those reactions and improve the effectiveness of kraft pulping of lignocellulosic materials. The method includes adding one or more phenolic compounds (e.g., xylenol) during the cooking stage of the kraft pulping process. The additives can be added to a digester vessel that contains chips of lignocellulosic materials (wood or non-wood derived materials) and the cooking liquors during the cooking step. The process of kraft pulping is not otherwise changed, with no additional equipment or process modifications required.

These phenols are commercially available chemicals that are not cost-prohibitive and can be used with most digesters. This novel method improves the performance of the kraft pulping process compared to the traditional process. Phenol additives change the structure of the lignin and enable hot water to penetrate the pulp, resulting in shorter reaction times and higher yields. The improved delignification from this method is demonstrated by 1) a decrease in Kappa number (the indicator of the lignin content in pulp) and/or, 2) an increase in pulp yield. As a result, the environmental aspects of kraft pulping are enhanced by improving yields in kraft pulping with little to no negative consequences to personnel and the environment. This method could be a cost-effective way to enhance delignification and increase yield without significant investment or environmental impact.

**Status:**

- U.S. Patent [11,390,990](#)
- Pending applications in Europe, Canada, Brazil, and Japan
- This technology is available for exclusive or non-exclusive licensing
- Technology demonstrated in laboratory experiments
- Partnering opportunities include licensing, collaborative research and sponsored research projects to advance this technology

*Early Stage*

*Lab Scale*

*Pilot*

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