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INNOVATION ADVANCEMENT & COMMERCIALIZATION

Chemical Treatment of Pulp Sludge to Increase Efficiency of Cellulase Production

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Reference: Cellulase production

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Overview

Auburn University is seeking a license or development partner for a method of treating waste pulp mill sludge that will increase the efficiency of cellulase enzyme production. Cellulase enzymes are one of the major cost factors in production of cellulosic ethanol. This method converts pulp sludge into a substrate suitable for bioconversion, with research showing treated sludge is equivalent to pure cellulose for the purposes of cellulase production. Thus, this method can be used to convert a current waste stream into a supplemental production unit.

Advantages

- Converts a waste stream into a potential revenue stream for paper mills
- Refines cellulosic waste sludge to make it more suitable for bioconversion
- Converts waste sludge into substrate for cellulase production equivalent to pure cellulose
- Utilizes simple chemical processing steps

Description

Waste sludge from paper mills contains organic contents essentially the same as those of bleached pulp. However, this sludge also contains a large amount of inorganic components (known as ash) mixed in during the paper making process. This ash is composed of calcium carbonate, the largest component, and several other minerals. Efficiently removing this ash is a critical step to make the organic component suitable for bioconversion into value-added products.

Cellulase enzymes for use in the biofuels industry can be produced from refined cellulose, pretreated agricultural residues, and waste paper by aerobic fermentation by microorganisms such as the fungus *Trichoderma reesei*. The yield of cellulase enzyme varies widely depending on the composition and other characteristics of the substrate.

Pulp mill sludge, when partially de-ashed by physical means, becomes an acceptable substrate for production of cellulase enzyme. However, the yield of cellulase enzyme from it is only about one third of that obtainable from pure cellulose. This invention describes a method of chemically treating partially de-ashed sludge that will increase the efficiency in cellulase enzyme production to that of pure cellulose. This may enable cellulase production to become a supplementary unit in pulp mills.

Status

- This technology has been verified on a lab scale
- Subject of US Patent [8,900,457](#)

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Partnering opportunities include licensing and funded development

Reference

- Wang, W., Kang, L., Lee, Y.Y. Production of Cellulase from Kraft Paper Mill Sludge by *Trichoderma Reesei* Rut C-30. *Applied Biochemistry and Biotechnology*. May 2010, Volume 161, Issue 1, pp 382-394. ([Link](#))