

Using Soy Proteins to Reduce Costs of Dewatering of Fibrous Sludge

A greener alternative to traditional polymeric flocculant sludge conditioners at a fraction of the cost

This technology provides a significantly more cost-effective method for dewatering fibrous sludge discarded from paper mills. By using soy proteins supplemented with a small amount of cationic polyacrylamide (CPAM), a polymeric flocculant, researchers at Georgia Tech have dewatered fibrous sludge and produced higher cake solids than when using 100% CPAM—and have done it at a much lower cost.

The process requires isolation of the soy protein from soy flour. By suspending the soy in alkali and then adding it directly to the sludge, the process separates the protein from the flour *in situ*. The CPAM, used to maintain filtrate clarity, is added afterward to avoid exposure to the alkali.

This combination results in an increase in cake solids during belt pressing of fiber or fibrous sludge. A slightly higher CPAM supplement can combat the higher filtrate total suspended solids (TSS) that may be experienced, reducing the cost savings accordingly.

The cost of the soy-CPAM combination is one-fifth that of CPAM used alone. Not only is the soy cheaper than the CPAM, but it also has less environmental impact than using 100% CPAM. In addition, the cost of soy is much more stable than the cost of CPAM, which fluctuates with the price of oil from which it is produced.

Summary Bullets

- **Cost-effective:** Decreases costs by 80% compared to using 100% CPAM
- **Greater price stability:** Experiences much less price fluctuation than the hydrocarbon feedstock from which CPAM is manufactured
- **More environmentally friendly:** Reduces the mass and volume of sludge requiring disposal and is a nonpetroleum-based option

Solution Advantages

- **Cost-effective:** Decreases costs by 80% compared to using 100% CPAM
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Potential Commercial Applications

- Paper production
- Mineral processing industries
- Other industrial processes

Background and More Information

Sludge is typically conditioned with a polymer such as a CPAM prior to dewatering and disposal. CPAMs are manufactured from a hydrocarbon feedstock and their cost fluctuates with the price of oil. Soy derivatives have been used in place of hydrocarbon-based products in several applications. Georgia Tech's new process replaces up to 90% of the traditionally used petroleum-based CPAM with soy protein and was tested on paper mill sludge and bleached hardwood fiber.

Inventors

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IP Status

The following patent application has published and additional international coverage is pending: US9644318B2

Publications

[Dewatering Fibrous Sludge with Soy Products](#), Paper 360° TAPPI.org - May/June 2015

Images

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