

BIOCHEM show case

Develop an easily removed, bio-based toner ink

Problem

More than 180,000 tons of electrostatic dry toners based on hydrocarbon-derived resins are used in the United States annually to make more than 3 trillion copies in photocopiers and printers. Conventional toners are based on synthetic thermoplastic resins such as styrene, acrylates and styrene butadiene.

These conventional resins make it difficult to remove the toner during recycling, a process called de-inking. This makes paper recycling more difficult. Although others have developed de-inkable toners, none of the competing technologies has become commercial due to high costs and inadequate de-inking performance.

Technical solution

With support from the Ohio Soybean Council, Battelle and Advances Image Resources (AIR) developed biobased resins and toners for office copiers and printers using soy oil and protein along with carbohydrates from corn as chemical feedstocks. Bioderived polyols were used in making polyester, polyamide, and polyurethane resins and toners, and chemical groups susceptible to degradation during the standard de-inking process were incorporated.

Benefits

- **Easier recycling of waste office paper without sacrificing print quality**
- **Improved, more efficient de-inking simplifies recycling and generates better quality secondary fibres**
- **Lower toxicity components than traditional toner inks**

Partnerships for better
innovation support



- Life-cycle analysis shows significant energy and carbon savings (at 25% market penetration in 2010, this technology could save 9.25 trillion Btu/yr and eliminate over 360,000 tons of CO₂ emissions per year)

The new toner is sold under trade names BioRez and Rezilution.

Further information

Battelle website

<http://www.battelle.org/>

EPA 2008 Greener Synthetic Pathways Award

<http://www.epa.gov/opptintr/greenchemistry/pubs/pgcc/winners/gspa08.html>