

Wastewater Treatment via Waste to Energy Method

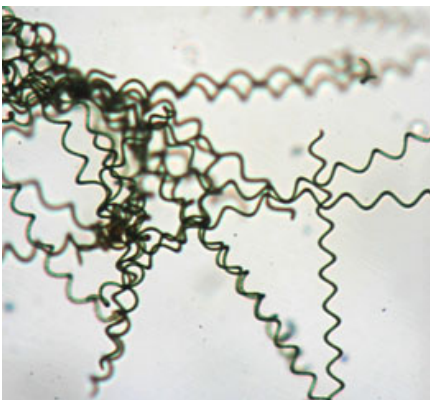
What if we could remove pharmaceuticals and personal care products (PPCPs) from our wastewater and produce a form of renewable energy in virtually the same process? The idea would be to grow algae in wastewater to remove excess nutrients (and also PPCPs (Pharmaceuticals and Personal Care Products)) and then convert the algal-treated wastewater into bio-oil and biodiesel. Drs. B.K. Sharma and Lance Schideman of ISTC, in conjunction with other University of Illinois at Urbana-Champaign researchers, decided to investigate that very idea.

They examined the effects of hydrothermal liquefaction (HTL) on the fate of bioactive compounds (BACs) such as PPCPs that are often present with wet biosolids from wastewater, manure, or algae in wastewater ponds. To do this, they tracked radio-labeled Carbon 14 (¹⁴C) for two bioactive compounds (BACs) and showed that 60-79% of the carbon was transferred to the hydrothermal liquefaction (HTL) raw oil product. Most of the rest of the ¹⁴C was found in the aqueous product.

In the presence of both swine manure and *Spirulina* algae biomass feedstocks, HTL (hydrothermal liquefaction) operated at 300°C for a minimum of 30 minutes provided essentially complete removal of three BACs. Experiments with both natural transformation and high-efficiency transformation showed that HTL provided complete deactivation of antibiotic resistant genes for all tested HTL conditions (250-300°C, 15-60 min reaction time).

Thus, incorporating HTL into wastewater treatment systems can simultaneously produce valuable bio-crude oil, provide effective removal of BACs such as PPCPs, and disrupt the natural pathways for antibiotic-resistant gene transfer from manure and wastewater biosolids to the environment.

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An example of Spirulina algae under magnification.

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Meet the Scientists

- B.K. Sharma
- Lance Schideman

Publications

- [Effects of hydrothermal liquefaction on the fate of bioactive contaminants in manure and algal feedstocks](#)

Articles

- [Proposed biomass recycling project could bring jobs to Rock Falls](#)



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