

Biochar Adsorbents for the Prevention of Food Processing Wastewater Discharges

Biochar adsorption technologies have the potential to be a scalable, closed-loop solution to point-source food production effluents in NYS while providing a value-added soil amendment product.

Keywords: biochar, adsorption, biological oxygen demand, soil amendment

Process Implementation Readiness



Background and Technology Description

Many food processing plants in NYS produce high-strength biological oxygen demand (BOD) waste streams that, due to clean water regulations, require processing before release back into the environment. Both dissolved air flotation (DAF) and publicly-owned treatment works (POTW) options consume large amounts of electricity, contribute to global warming and are costly to businesses.

Biochar is charcoal purposefully created from organic wastes via pyrolysis or gasification to sequester CO₂, and because of its high surface area and porosity can serve as an effective filtering medium. Test results obtained at Rochester Institute of Technology showed excellent biological oxygen demand (BOD) reduction of up to 58% by treating effluent from tofu, milk and beer production with biochar obtained from pyrolysis of maple wood chips.

Technology Benefits and Value

- A circular ‘biorefinery’ approach was proposed whereby the aqueous wastes of a food production process can be filtered by pyrolyzed solid food waste and finished by a secondary treatment process, such as a microbial fuel cell (MFC). The nutrient loaded biochar could then be reused as a value-added soil amendment.
- Subsequent collaborative greenhouse plant trials with the Department of Horticulture at Cornell University verified significant fresh weight yield enhancements above control in tomato (+39%), lettuce (+38%) and basil (112%) plants at 5% and 10% soil addition rates.

Target Customers

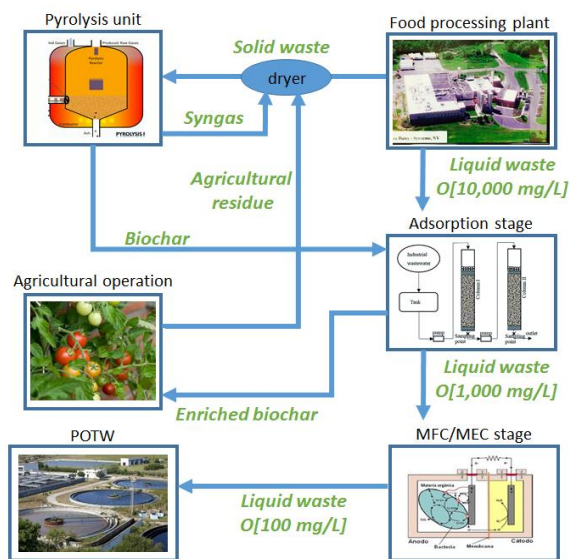
Specialty Greenhouse Crop Producers and Food Manufacturers – Producers of specialty high value greenhouse crops would benefit significantly by adding nutrient laden carbon back into their potting soils while food manufacturers could save on DAF and POTW effluent treatment costs. For example, since produce is typically sold according to weight, basil producers could double their gross income if they could double their average plant’s fresh weight by utilizing a dairy or tofu manufacturer’s excess nutrients that they otherwise would have to pay to get rid of.

Intellectual Property

This technology is currently not under patent.

Opportunity

NYSP2I and RIT are interested in working with qualified parties for continued technology and product development.



Dr. Eugene Park, Assistant Technical Director www.nysp2i.org 585.475.2512