Nutrient Recycling Program

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Agriculture and Forestry is refining aerobic digestion to convert organic wastes into readily-available plant nutrient solutions. Poultry manure is fermented to produce biologically active plant nutrient solutions. Oxygen addition increases the microorganisms' metabolic activity and eliminates odours. Pathogen pasteurization occurs from an induced thermophilic step. To date, we've attained temperatures in excess of 70° C. The loss of nutrients is minimized by maintaining acidic conditions. Organic certification has yet to be undertaken. The inorganic acids used are allowed in producing organic fish-based fertilizers. The technology yields liquid and solid products.

Our bio-nutrient solutions have been trialed in greenhouse and field applications. Greenhouse applications recycle all water where sodium buildup can be an issue.

Urban agriculture is showcased with an outdoor trial where food is grown on an asphalt lot complete with water recycling.

We are working with a producer research group to assess the solutions impact on soil health. The project has had some success cultivating oyster mushrooms on the pasteurized residual solids. These lignocellulosic residual solids are largely from bedding materials. Soil remediation experts are interested in this solid product as a means to increase soil carbon without potential nutrient overloading.

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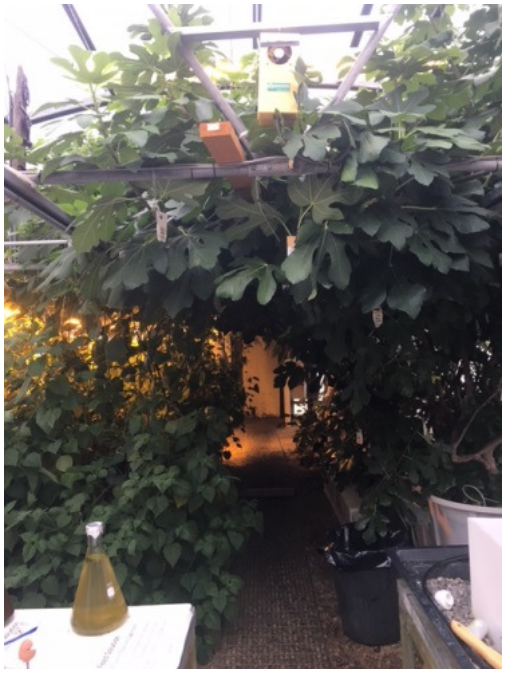
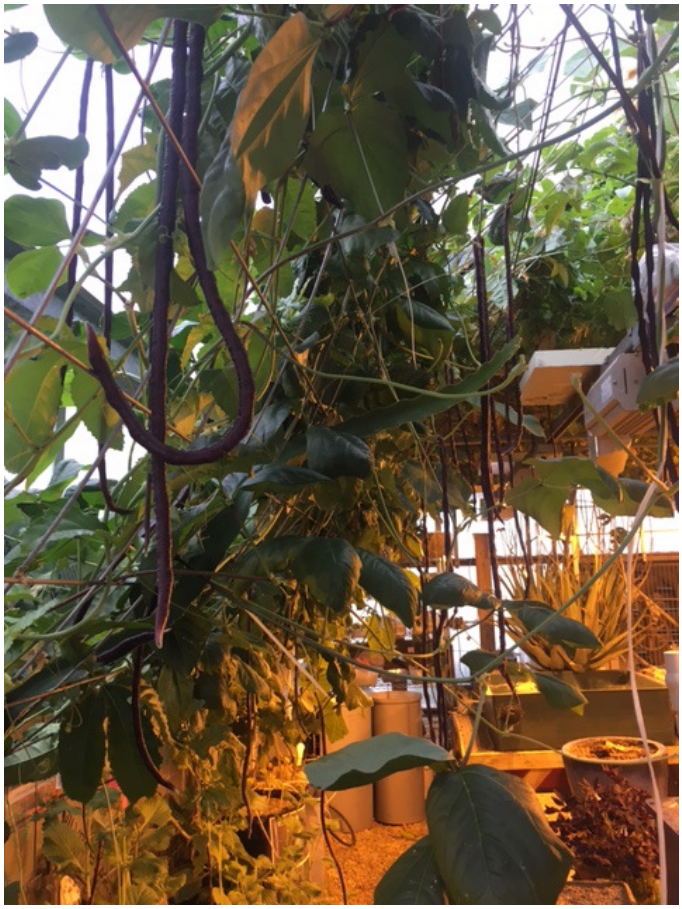
This innovative technology can ferment other organic wastes, in particular other manures and food industry waste streams. Co-fermenting a waste-stream rich in soluble carbon would be ideal. Fermentation batches typically require much more acid than base to maintain a pH below neutral; on occasion likely triggered by fermentation conditions some batches require considerably more base – implying protons are released. Microbial Electrolysis Cell, a novel technology (not yet trialed by AF), utilizes microbes to release protons while digesting organic matter. A weak battery emits electrons into the solution; in the presence of a catalyst the electrons and protons join to produce hydrogen.





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