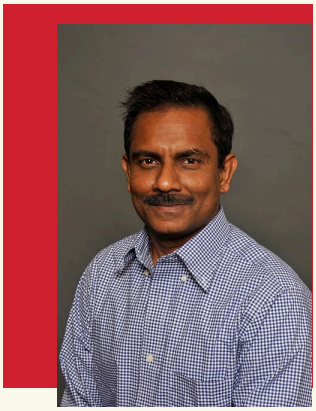
November 15, 2024

Environmental Benefits of Algae-Based Fertilizers: A Sustainable Approach to Soil Health and Crop Productivity



Venkatesh Balan

Professor, Department of Technology

ABSTRACT: This talk will explore the potential of algae as a sustainable, nutrient-rich fertilizer for enhancing soil and plant health. Algae, as photosynthetic organisms, utilize sunlight to transform carbon dioxide and inorganic nutrients like nitrates and phosphates into complex organic compounds, naturally releasing oxygen in the process. Rich in essential nutrients such as nitrogen (N), phosphorus (P), and potassium (K), algae are effective fertilizers that also contain growth-promoting hormones and other beneficial compounds. Unlike chemical fertilizers, algae-based alternatives are organic, environmentally friendly, and can be cultivated sustainably in nutrient-rich wastewater, providing a renewable source of key nutrients. The presentation will cover recent research on the use of algal biomass as a soil health enhancer, beginning with a comparison of environmental impacts between synthetic and algae-based fertilizers, particularly regarding greenhouse gas emissions and water pollution. We will discuss analyses of algal biomass composition—including NPK, heavy metals, proteins, fibers, and phytohormones—and results from controlled studies on cotton plant growth and gene expression. Field trials at PVAMU are underway, focusing on the potential of algae pellets to reduce synthetic fertilizer and pesticide use, as well as greenhouse gas emissions. This work positions algae-based fertilizers as a promising solution for reducing agriculture's environmental impact.

BIOGRAPHY: Dr. Balan has been an Associated with the Department of Engineering Technology, Cullen College of Engineering, University of Houston, since September 2017. His research focuses on biomass conversion to fuels, chemicals, edible mushrooms, animal feed, and biomaterials. He also specializes in CO2 sequestration using algae, processing algal biomass into proteins, biofuels, and biochemicals, and adding value to mushroom industry waste. Additionally, he works on annotating fungal genes to identify novel enzymes for industrial applications. Dr. Balan has published over 195 papers, holds 9 patents, and has more than 17,250 citations. He has also edited books on biomass conversion and microbial lipids and served as an expert reviewer for numerous scientific journals and review panels.

Seminar Details

Friday, November 15, 2024 2:30pm – 4:00pm

UH Campus
Classroom & Business Building
Room CBB 104

Online via Teams https://www.cive.uh.edu/research/beyer-distinguished-lecture