Project Summary

Participating Faculty

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Project Title: “Plant-Based Air Filtration using Engineered Growth Media: Formaldehyde Adsorption Dynamics”

Summary (200 words maximum): In the US, poor indoor air quality (IAQ) has been linked to between 65,000 and 150,000 deaths and to economic consequences ranging from US$40 to 160 billion annually. Additionally, it has been determined that people in developed countries, particularly within urban areas, spend an average of 80% to 90% of their time indoors. By addressing the IAQ concerns in buildings and at the same time, reducing the energy load from the HVAC systems in the buildings, a significant impact can be made on the urban environment. HVAC-integrated botanical walls that include engineered growth media that serve support for the plants and capture toxins that are then metabolized by the plants can create a self-regenerating filtration system that requires less outdoor air being fed into the building, thereby reducing the conditioning costs associated with HVAC. The proposed work investigates the use of ionic-liquid functionalized activated carbon (AC-IL) granulated with porous growstone as a novel engineered growth media for formaldehyde remediation, a toxic and common indoor air pollutant. Formaldehyde adsorption dynamics will be tested in both plant modules containing engineered growth media and in packed beds containing AC-ILs.