



Minority University Research and Education Project (MUREP)

Institution: CUNY New York City College of Technology

City/State: Brooklyn, NY

Award Name: MUREP Partnership Learning Annual Notification (MPLAN)

Award Number: N/A

Title: PEGDA for Seed Growth: Microgreens in Space/ KSC-2: Expendable Growth Substrate and Hardware Development for the Safe Production of Microgreens

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PI Email: N/A

Award Fiscal Year: FY2024

Summary:

The objective of this research is to address the challenges of microgreen cultivation using minimum amount of water in space. Microgreen fragility, degradation speed, and limited water resources are substantial barriers for astronauts. In order to address these challenges, we aim to cultivate microgreens inside a hydrogel, a soilless medium, to minimize water usage. We propose using Polyethylene Glycol Diacrylate (PEGDA), a biocompatible polymer, to fabricate the hydrogel matrices that provide the required moist environment for microgreens. Hydrogels will be fabricated using photolithography. In the fabrication process, the microgreen seeds will be encapsulated within the hydrogel matrix. To help seeds to germinate within the hydrogels, the required nutrients will be provided internally through inbuilt 3D flow channels which will enable nutrient diffusion through the hydrogel to provide the best growth conditions. This research will be a collaborative work between two MSIs, CUNY and CSU, Chico. If awarded, the investigators and students will conduct fundamental research to address NASA's microgreen production challenges and enhance resource utilization in space habitation.