

Liquid Tree Abstract

Urbanization has caused a severe depletion of green cover leading to a rise in carbon emissions and bad air quality. Similar to how one can convert unnoticed waste into noticeable wealth, our aim in choosing this project was to take a step forward in conserving land and maximizing 24/7 air purification. We devised a self-sustaining Solar-Powered Liquid Tree using Spirulina algae which has huge potential for afforestation in modern-day cities with very little space.

The method of work we carried out for the purpose was very simple to do. We created a custom solar panel assembly in our Atal Tinkering Lab (ATL). This solar unit charges during the day to power a light source for the Spirulina culture during the night. We integrated a CO₂ sensor directly into the photobioreactor setup to actively capture air quality changes.

We observed the sowed algae day after day and took photographs to measure the gas exchange and biomass growth rates. The sensor data showed continuous, uniform growth and a rapid drop in ambient CO₂ levels around the clock due to the night illumination.

From this project we came to the conclusion that solar-powered Spirulina liquid trees could be a great tech solution for air pollution. By deploying these automated cultured tanks in our school campus, we can conserve soil which is a limited natural resource, and use renewable energy to fight urban carbon emissions efficiently.