

Phycology Facility

Instruments in this facility

- Algal Growth Chamber (Illuminated Incubator)
- Inverted Research Microscope

PHYCOLOGY FACILITY

Algal Growth Chamber (Illuminated Incubator)

The Algal Growth Chamber is a controlled-environment culture system designed for the maintenance and cultivation of microalgae, cyanobacteria, and macroalgal cultures. It provides precise control of light intensity, photoperiod, and temperature, allowing reproducible growth conditions for physiological, biochemical, and biotechnological studies of algae.



Key Specifications

Parameter	Specifications
Instrument Type	Controlled-Environment Algal Growth Chamber
Temperature Range	4 – 40 °C
Temperature Stability	±0.5 °C
Light Source	Full-spectrum LED panels (cool white, red, blue)
Light Intensity	Up to 300 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$ (adjustable)
Photoperiod Control	Programmable light/dark cycles (0–24 h)
Culture Capacity	Multi-shelf; flasks up to 2 L, test tubes, and culture plates
Agitation	Optional orbital shaker platform (20–200 rpm)
Humidity Control	Optional, 40–80% RH
Interface	Digital touchscreen controller with programmable profiles
Safety Features	Over-temperature protection and door-open alarm

Signature Features

- **Programmable Light Regimes:** Adjustable intensity and photoperiod allow simulation of natural day/night cycles and light-stress experiments.
- **Spectral Flexibility:** Independently controlled LED channels enable studies of light quality effects on growth, pigment composition, and photosynthesis.
- **Precise Temperature Control:** Stable temperature regulation supports reproducible growth kinetics and temperature stress studies.
- **Uniform Illumination:** Even light distribution across shelves reduces culture-to-culture variability.
- **Energy-Efficient and Reliable Design:** Low-heat LED lighting and a robust build make the chamber suitable for long-term culture maintenance and routine teaching as well as advanced research.

Research Applications

- **Algal Culture Maintenance and Strain Conservation:** Supports long-term maintenance of stock cultures, axenic and unialgal isolates, and germplasm collections of freshwater and marine algae.
- **Growth Kinetics and Physiology:** Enables measurement of growth rate, biomass productivity, and cell density under defined light, temperature, and nutrient conditions.
- **Biofuel and Bioenergy Research:** Used to screen and optimize lipid-rich microalgal strains for biodiesel, biogas, and biohydrogen production.
- **Pigment, Nutraceutical and Bioactive Compound Studies:** Facilitates production of chlorophylls, carotenoids, phycobiliproteins, PUFAs, and other high-value metabolites.
- **Environmental Stress and Climate Change Studies:** Allows controlled experiments on the effects of light, temperature, salinity, nutrient limitation, and pollutants on algal physiology.
- **Bioremediation and Wastewater Treatment:** Supports evaluation of algae for nutrient removal, heavy metal uptake, and CO₂ sequestration.
- **Taxonomy and Ecology:** Assists in isolating, purifying, and characterizing algal species from diverse aquatic and terrestrial habitats.