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Building and Using the Illuminated Orbital Shaker

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Works for me

dx.doi.org/10.17504/protocols.io.bgvpiw5n

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ABSTRACT

The building of a bottom-illuminated orbital shaker designed for the cultivation of microalgae suspensions is described in this protocol collection. The instrument agitates and illuminates microalgae suspensions grown inside flasks. It was optimized for low production cost, simplicity, low power consumption, design flexibility, consistent, and controllable growth light intensity.

The instrument has been used to grow fresh-water microalgae *Desmodesmus quadricauda* and *Chlorella vulgaris*. The cultivation protocols are included in this collection.

EXTERNAL LINK

<https://doi.org/10.1101/2020.05.01.071878>

THIS COLLECTION ACCOMPANIES THE FOLLOWING PUBLICATION

Bottom-Illuminated Orbital Shaker for Microalgae Cultivation Jakub Nedbal, Lu Gao, Klaus Suhling bioRxiv 2020.05.01.071878; doi: <https://doi.org/10.1101/2020.05.01.071878>

GUIDELINES

This collection described the steps to building and assembling the algal shaker.

MATERIALS TEXT

Materials are described in each protocol of this collection. A dedicated protocol Procurement of Parts for Algal Shaker specifically focusses on obtaining all the materials.

SAFETY WARNINGS

The work on this project involves a number of hazards. The risks are low with appropriate safety precautions in place. The warnings are discussed in details in the individual protocols. In general, the hazards involved in electronics soldering, mechanical workshop tools use, and optional laser cutter and 3D printer use. The risks include exposure to fumes, solvents, hot surfaces, electrical current, and potentially lead during soldering; cutting or bruising and dust during mechanical workshop works; exposure to fumes, hot surfaces, and potentially solvents during optional 3D printing; and exposure to fumes and laser irradiation during optional laser cutting. The protocols for operation of the illuminated orbital shaker and for cultivation of microalgae come with specific hazards. These namely involve autoclaving hazards, such as high temperature and pressure, risks from broken glass, spillage, and water ingress into electrical installations.

FILES



Illuminated Orbital Shaker for Microalgae Culture

Version 3

by Jakub Nedbal, King's College London



Procuring Parts for Algal Shaker

Version 2

by Jakub Nedbal, King's College London



Assembling LED Controller Electronics

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3D Printing Case for LED Controller
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Assembling Cooled LED Illuminator
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Assembling Algal Shaker
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Measuring PPFD on Algal Shaker
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Preparing 1/2 SŠ Algal Inorganic Nutrient Medium
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Autoclaving Erlenmeyer Flasks for Sterile Algal Cultures
by Jakub Nedbal, King's College London



Culturing *Chlorella Vulgaris* and *Desmodesmus Quadricauda*
by Jakub Nedbal, King's College London



Counting Microalgae Culture Density
Version 2
by Jakub Nedbal, King's College London