KillaLab

Principal Investigators

Name	Qualification	Institution
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Scientific Objective

It is important to understand the effect of radiation on living organisms in space. TeamIndus and Team KillaLab propose together to use cyanobacteria, an extremophile, to observe the effect of UV radiation on them. The morphological changes will be observed by using a camera.

Specifications

Dimensions: Φ62mm x 116 mm

Mass: 242 grams

Power: 3W

Operating Voltage: 5V

Operating Temperature: -40°C to +60°C

Storage Temperature: -40°C to +80°C

Data Interface: RS-485

Specimen: N/A.

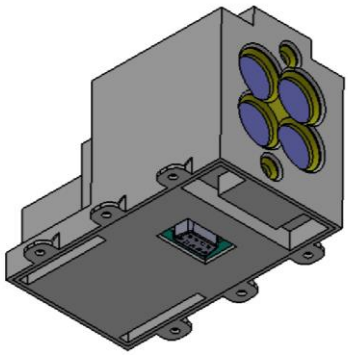

Figure 1: Lab2Moon: KillaLab Experiment

Mission Description

Once the conditions are suitable, the cyanobacteria are activated with LED and heat to “awaken” them. UV sensors obtain data from the radiation that has passed through the biofilm, and a camera is used to click images of the biofilms. The data collected by the electronic equipment will be sent to the onboard computer and finally to the control room at TeamIndus facility for further analysis.

Mission Operations

The payload is located on the Top Deck, Sector 3, facing East. Initial sensor readings will be taken on day 3, once every 4 hours, and images taken once every 2 hours on subsequent days till Day 6. The prerequisite for the experiment is the need for sunlight.

Heritage Experiments

Reference Mission Name	Specifics of Reference Mission	Lab2Moon Mission Specifics
UV protection in cyanobacteria [M Ehling-Schulz, 1999]	This paper looks at generalised internal processes of cyanobacteria to protect itself from UV radiations.	The payload aims at making a comparative analysis of UV absorption by different species on the lunar surface, directly exposed to galactic cosmic rays.
BIOMEX - NASA EXSPOSE R2 Mission	Observed the effect of UV radiation on cyanobacterial species.	Aims to observe the effect of UV, as well as cosmic radiation on different species of Cyanobacteria.

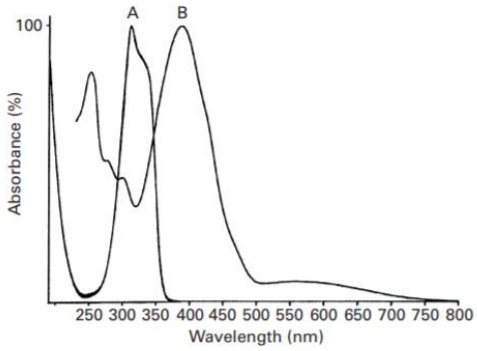

Fig. 3. UV screen. (*A*) Absorption spectrum of oligosaccharide-MAA in H_2O (according to Böhm *et al.*, 1995). (*B*) Absorption spectrum of scytonemin in tetrahydrofuran (according to Proteau *et al.*, 1993).

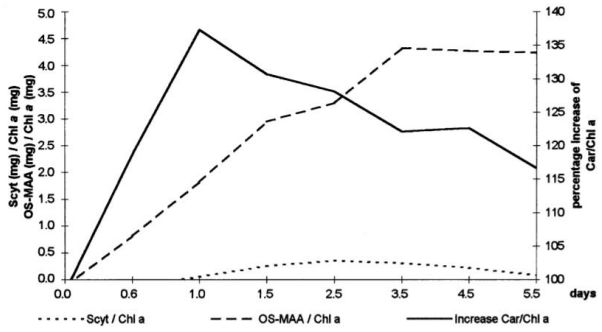

Fig. 4. Time course of the response of photosynthetic and UV-absorbing pigments of *Nostoc commune* to UV-B irradiation (1 W m^{-2}). (For details see Ehling-Schulz *et al.* (1997).) Abbreviations: Scyt, scytonemin; OS-MAA, oligosaccharide-mycosporine; Car, total carotenoid; Chl *a*, chlorophyll *a*.