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FEASIBILITY OF LIFE SUPPORT FOR HUMANS IN SPACE WITH AN OXYGEN "BATTERY"
SYSTEM WITH THE MICROALGAE CHLORELLA VULGARIS

Abstract

In the exploration of new environments for human life both on planet Earth and in space, technological challenges arise. These challenges include, among others, transportation, supply logistics and communications. Each challenge presents known factors and others not previously known, this supposes the maximum effort for human groups that want to explore inhospitable environments. Researchers from The Mars Society Chapter Colombia and the Shaio Clinic Foundation have developed some oxygen "battery" system with the microalgae *Chlorella vulgaris* as a contribution to life support for explorer travelers, with which they seek to solve one of the basic needs and fundamental for any human being, breathing. The methodological stages of the research are consistent with the experimental designs and industrial scale-ups reported in the literature and published experiences of the microalgae production sector. The studies began in 2012 in Colombia. For all the cultures in photobioreactors the following parameters were provided: i) lighting, artificial light was supplied; ii) Bristol culture medium, with a photoperiod of 14:10 h, temperature $17 \pm 2^\circ\text{C}$ and an initial pH of 7.0. The portable bioreactor system and its consequent connection to the space helmet and a monitoring system of the physicochemical variables were developed. This portable system will increase autonomy in exploratory walks and will additionally provide an alternate system for transforming carbon dioxide and generating oxygen, which will ultimately sustain self-sufficient human exploration activities in anoxic places in our solar system.