

Ground-Based Preparatory Activities (11)
Ground-Based Preparatory Activities (2) (2)

Author: Dr. Sofya Ushakova

Institute of Biophysics, Russian Academy of Sciences (RAS), Siberian State Aerospace University, Russian Federation, ubflab@ibp.ru

Dr. Sergey Trifonov

Institute of Biophysics, Russian Academy of Sciences, Siberian Branch; Siberian State Aerospace University, Russian Federation, trifonov_sergei@inbox.ru

Dr. Vladimir Velichko

Institute of Biophysics, Russian Academy of Sciences (RAS), Siberian State Aerospace University, Russian Federation, ubflab@ibp.ru

Mr. Yegor Morozov

Institute of Biophysics, Russian Academy of Sciences, Siberian Branch; Siberian State Aerospace University, Russian Federation, transserfer89@gmail.com

FEATURES OF CIRCULAR PROCESSES OF CHEMICAL COMPOUNDS AT THE TESTING OF AN
EXPERIMENTAL CLOSED LIFE SUPPORT SYSTEM

Abstract

A working physical model of a closed ecosystem that allows testing various circular processes has created. The report discusses the features of the circulation of the main mineral elements in the formation of matter turnover processes in a small ecosystem. The closure value is analyzed, and the search for places of individual mineral element' storage is performed. In particular, it is shown that some mineral elements can be retained in the pores of the substrate used for growing plants. The problem of including sodium from mineralized human exometabolites in the cycle is considered. To solve the problem of increasing the involvement of phosphorus in the circular process, it was decided to use a non-porous neutral substrate in subsequent experiments. In the long-term experiment to solve the problem of depletion of the soil-like (biological) substrate by potassium and increase the system closure coefficient for mineral elements, the modes of return of inedible plant biomass to the substrate in accordance with the removal of both potassium and nitrogen from the edible biomass of plants grown on this substrate are considered. In conclusion, we consider the comparative characteristics of the inclusion of a complex of mineral elements in the nutrient solution for watering plants in the circular process of a closed ecosystem.