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University, Russian Federation, trifonov_sergei@inbox.ruANALYSIS OF THE WATER BALANCE IN A CLOSED EXPERIMENTAL MODEL OF THE
ARTIFICIAL ECOSYSTEM INTENDED FOR A RATED FRACTION OF A HUMAN**Abstract**

Researchers of the Institute of Biophysics SB RAS have constructed an experimental model of the closed ecosystem (EMCES) intended for a rated fraction of a human. The EMCES is designed to create cycling processes and test various technologies for maintaining the high degree of closure of the mass exchange loops. The human contributes to establishing the EMCES cycling by taking part in gas exchange and by including human liquid and solid wastes into the mass exchange. In this study, we have analyzed the water balance of the system and calculated the amounts of water necessary for growing plants and for human consumption. The study considers the water cycling in the EMCES and the rate of evapotranspiration by plants of the phototrophic compartment in order to quantify the water available to the human. The experiments carried out in the EMCES showed that the water contained in the plants constituted about 2% of the total amount of water in the system – about 240 L. The amount of water necessary to grow 1 g dry matter was found to be 247 ml. The analysis of results showed that all evapotranspiration water could be used for human consumption and other everyday needs. The study discusses water exchange in the EMCES functioning for extended periods of time (many months).