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COMPARISON OF DIFFERENT PLANTS CULTIVATION SYSTEMS IN FUTURE EXTRATERRESTRIAL COLONY

Abstract

Current plans for the colonization of other celestial bodies are increasingly advanced. More and more often we can hear about the plans for creating a base on the Moon or Mars. Future extraterrestrial bases will have to be highly independent also in the context of food production. For this reason the most optimal method of growing plants should be found. To conduct maximally optimized process, choosing the right cultivation system is essential. The most popular method on Earth - soil cultivation was tested for example in Biosphere 2. The second type of plants cultivation is a soilless cultivation. This type could be divided in two main types. The first one is hydroponic. In this type of system plants are cultivated in an aqueous semi filled with nutrients. Hydroponic were tested on Earth in habitat analogues such as BIOS-3, the Integrated Life Support System Test Facility and on the International Space Station as a Veggie experiment. The second type of soilless plants cultivation is aeroponic. This type is less popular in comparison to hydroponic and soil cultivation, but is also beneficial in regard to deep space mission. In this system plants are kept in the air. The nutrient solution is delivered by sprinklers directly to the root system. Aeroponic is tested in analog called Eden ISS project. Compared to the Hydroponic and soil cultivation aeroponic is characterized by for example lower equipment mass, lower water consumption and higher yield, however this type of plants cultivation has also some flaws. In this paper three types of plant cultivation soil cultivation, hydroponic and aeroponic have been compared in the context of their usefulness in future extraterrestrial bases.