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ALTERNATIVE PROTEIN SOURCES FOR HUMAN FOOD ON MARS

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This article shows a part of the documentary review carried out in 2020 in the framework of the Mars City State 2020 Contest of The Mars Society, focused on the issue of ensuring food safety, posing the following question: Why are protein sources an alternative to human food on Mars?

The Martian environmental offer and the water resource must be taken into account, for which the presence of liquid water at the underground level has been identified. Regarding geology and soils, the mineralogical composition with a predominance of manganese has been affirmed, conferring ferric properties, accumulation of soluble salts on the surface, carbonates, gypsum, shales and phyllosilicates and in this regard it has been reported (Certini et al., 2020) under the different systems of taxonomic classification of soils, showing that the geochemical origin of the soils will be a deter mining factor in the management of a Martian agricultural productive system.

Studies of terrestrial analogues (Wamelink et al., 2014, 2019) and in conjunction with research from Wageningen University and NASA, have made it possible to understand the behavior of seed germination and plant generation, for example, with the JSC-1A Mars-1a regolith simulator from Mars, flowering and seed production were obtained for tomato.

Faced with our initial question, the following variables could be considered: genetic variability, adaptability, high response capacity to abiotic stress, low production costs, and nutritional contribution. Therefore, we could take into account the use of quinoa and bean crops for their protein content, as well as that of insects, varying their protein content according to the metamorphic stage, habitat and diet. Additionally, cultivable edible fungi can be considered as an adequate supply of proteins, as well as microbial protein or Single Cell Protein (SCP), which is the protein obtained from the biomass of unicellular organisms such as bacteria, fungi, micro and macro algae, which contribute to protein demand when used to increase the protein content or quality of fermented products (Bourdichon et al., 2012).

It is concluded that it would be necessary to review the different possibilities related to the Martian environmental offer, the installation of infrastructure, the implementation of technological and biotechnological processes, the possibility of permanent and sustainable access to food; all this thinking of a system where food is collective to guarantee and optimize resources, food security and access to nutrients for a healthy life.

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