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BUG BURGERS IN SPACE: A FEASIBILITY STUDY OF HUMAN ENTOMOPHAGY IN FUTURE
LUNAR AND MARTIAN SETTLEMENTS

Abstract

Long-distance space travel and prospective human settlements on the Moon, Mars and beyond will require the implementation of food production systems which are efficient, compact, resilient and overall, regenerative. Many researchers have suggested the inclusion of insects, a popular food source since pre-history, as part of the solution, but to date there has been no technical feasibility study that directly compares insect farming to other non-plant food sources in the context of Human Space Exploration. This technical study compares different types of commonly available livestock, popular edible insects and non-regenerative food supplies in long-term mission study cases. As a primary objective we are generating energy, mass and volume budget estimate comparisons, as well as caloric and nutritional values in long-term manned missions. As a secondary objective, we are assessing the potential for automation, waste reclamation and remediation, biproducts and hygiene. Commonly consumed insect species include silkworms (*Bombyx mori*), crickets (*Acheta domesticus*), mealworms (*Tenebrio molitor*), cockroaches (*Periplaneta americana*) and black soldier fly larvae (*Hermetia illucens*). We are drawing from the corporate knowledge of farming industries (livestock and insect), studies of the nutritional value of different food sources and earlier studies which have focused on single solutions.