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Human Exploration of the Moon and Cislunar Space (1)

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GREEN MOON: TURN HUMAN WASTE MATERIAL INTO AGRICULTURE FERTILISER USING
BIODIGESTER DEVICE

Abstract

In the recent decade, huge ambitions have risen to establish permanent human presence and activity on the Moon. So it became crucial to pave the way toward recycling wastes on the Moon's surface, especially human waste, and process them into biological ends for crop production via fertilizers. This would help produce and guarantee good quality food security on the Moon. Our project is called Zero Waste on Moon Surface. The main objective is to develop a process to valorize the Azote(N), Phosphor (P), and Potassium (K) contained in the liquid phase of sewage coming from human waste, food wastes, and other biological feedstock in anaerobic processes to produce fertilizers for crops on Moon and carbon sequestration on Moon soil using a biodigester device. This device has been tested for more than a year on the ground, and the results were auspicious regarding its functionality to turn human and animal waste into fertilizers. We were able to produce the fertilizer without releasing Greenhouse gas such as carbon dioxide (CO₂) and methane (CH₄). To better understand the mechanisms and study the impact of the foremost parameters to produce organic fertilizers on the Moon, we have to adapt the digester device, this device has anaerobic bacteria obtained and will be kept at a high thermophilic condition, and with an embedded robotic system that helps to check timely the temperature in the digester. Due to the hit of solar on the Moon (127 degrees Celsius) when sunlight hits the moon's surface, and (minus 173 C) when the sun goes down; the digester will be used at thermophilic parameters to adjust its temperature. The main challenge of this experiment is how to squeeze water out of the moon's atmosphere permanently for the anaerobic digestion of wastes within the digester, and determine the type of digester that will best fit the warmth of the Moon.