A Trip to Mars Needs Waste

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On the long space trip from Earth to Mars "the crew won't be able to get by with a bag lunch and Portapotty," says Arthur Teixeira, a professor of agricultural and biological engineering at the University of Florida. Teixeira presented a plan for how NASA could deal with waste deposal during such a voyage at this week's Institute of Food Technologists annual meeting.

Teixeira estimates the Mars trip would take six to eight months. The ship would likely remain on the planet for 18 months before Mars and Earth's orbits would bring them close enough together for the return trip. In all, the six-person crew would be off the Earth's surface for about three years.

Teixeira's plan hinges on patented technology developed by the university called Sequential Batch Anaerobic Composting (SEBAC) that is currently used in landfills. That system turns waste into compost by cycling material among different containers.

Adapting the technology for space travel raises numerous problems, the obvious one being zero gravity to move material among processing containers. The SEBAC II, developed with space travel in mind, solves this by using additional receptacles and several pumps. The pumps move the fermenting waste among the various chambers to create compost.

The SEBAC II system would compost human waste, inedible food material such as plant stems and roots, and paper used for things like moist toilettes used by the crew in the place of baths or showers.

Teixeira says the spaceship would probably carry enough food in reusable packages to sustain the crew during the trip to Mars. During a portion of that time, crews would collect the processed waste for use as compost upon arrival and established a greenhouse to grow foods.

While on Mars, the crew would deliberately create leftovers at each meal, which in turn would complete the cycle when stored in the reusable packages for the return trip.