National Aeronautics and
Space Administration

technology solution

Health, Medicine and Biotechnology

Solid And Liquid Waste Drying Bag

An Invention that can be used as a portable toilet, for medical waste, hazardous waste, or sludge from water treatment operations

This invention facilitates collection, storage, concentration, and drying of liquid or mixed liquid/solid material. Material may be medical waste, aqueous hazardous waste for which disposal cost is high, such as radioactive salt solutions, or brine or sludge from water treatment operations. It can be used to dry biological specimens or concentrate water samples for analysis. It can also function as a portable toilet.

BENEFITS

- Products of the system are clean
- Simplifies collection
- Reduces disposal cost
- Vacuum-dried waste is more stable
- Controls odor
- User friendly

THE TECHNOLOGY

This invention addresses the problem of human solid waste disposal in microgravity, and consists of a soft-sided container or bag that (1) collects wet material using airflow, (2) compacts material under vacuum, and (3) dries material under applied vacuum. End products are clean water and dried, compacted, and bagged material. The bag includes a liquid-impermeable and vapor-impermeable outer layer and a liquid-impermeable but vapor-permeable inner layer membrane, defining an inner bag, through which some vapor can pass. The port is located in the outer layer, and activation of the vacuum source causes some of the original vapors and vaporized liquids to pass through the membrane liner. Liquid components of the moist waste solids within the bag may also be vaporized and transported across the membrane. Waste solids, such as excrement, remain in an inner layer defined by the membrane, and are partly dried by withdrawal of vaporized liquid and vaporized liquid components in the moist solids. These waste solids are thereby trapped and sealable in the bag, while the original vapors and the vaporized portion of the liquids pass through the membrane and are received by an outer bag defined by the membrane and the outer layer of the bag. After use, the bag is sealed and stored for ultimate disposal.

One of the applications of the technology is clinical waste disposal

APPLICATIONS

The technology has several potential applications:

- Aircraft / Spacecraft
- Hazardous Waste management
- Medical Waste
- Water treatment operations
- Portable Toilets
- Biological specimen analysis

PUBLICATIONS

Patent No: 7,490,367

More Information

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