NASA TECH BRIEF

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Electrolytic Silver Ion Cell Sterilizes Water Supply

An electrolytic water sterilizer has been developed for control of microbial contamination in manned spacecrafts. Individual sterilizer cells are self-contained and require no external power or control. The compactness and light weight of the units (measuring 2.5 inches in diameter × 4 inches in length and weighing 0.6 pound) and absence of external mechanisms make it possible to integrate such sterilizers with the potable water supply or waste water system in confined areas.

The sterilizer generates silver ions in concentrations of 50 ppb (parts per billion) to 100 ppb in the water flow system, the desired concentration being adjusted as a function of the average water flow rate. After installation of a unit, no maintenance is required. Operation of the unit is self-limiting, precluding damage to the system if water ceases to flow. A shunt is provided for on-off functions and monitoring of current flow. Unit life expectancy is 9000 hours without a change of the power supply batteries.

Laboratory tests of the sterilizer under simulated conditions have demonstrated essentially complete kill within 8 hours of *Staphylococcus aureus* and *Escherichia coli* bacteria present in initial concentrations of approximately 5×10^5 organisms per milliliter.

Silver ions in concentrations of 50 to 100 ppb, which are nontoxic when ingested, have been recognized for many years as an effective bactericide. Since a sterilization unit for spacecraft water systems must operate in zero gravity, consume little electrical power, and require no heat, elaborate controls, or material replacement, the use of silver ions in a spacecraft sterilizer has many advantages over other possible sterilization methods. Many of the advantages of the new sterilizer, including the advantage that the silver ions do not impart an unpleasant taste to the water, can be realized also in non-space applications. This water sterilizer should also be of value to biological laboratories, pharmaceutical companies, and underwater craft.

Note:

Design details and test results are contained in Report NASA-CR-65738 which is available from:

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Patent status:

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