

NASA TECH BRIEF

Manned Spacecraft Center



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A Silver Ion Water Sterilization System

A novel method of sterilizing water has been developed. Small amounts of silver are incorporated in a mixture of ion exchange resins and water passing through this mixture is thus exposed to a concentration of silver ions. Silver ions are a well-known bactericide, but silver salts have not previously been seriously considered as a substitute for sodium hypochlorite because of their corrosive and toxic qualities. In this new method, however, the deleterious effects attributable to silver ions have been contained. The system will therefore be useful in self-contained water systems such as those in aircraft and trailer vehicles, and to campers. However, this method of sterilization may not be applied to city water systems, for which a residual chlorine level is stipulated.

Considerable effort has been devoted to the development and study of techniques for sterilizing the drinking water supply carried aboard Apollo spacecraft. The most common sterilant is sodium hypochlorite, and silver ions have not been seriously considered as an alternative until recently. Concern about the corrosive potential of silver salts and anxiety over their toxicity have been the main reasons for this. But silver ions are known to be an effective bactericide and, if these hazards are overcome the concept of using silver ions has some distinct advantages: small sterilizing units, easy to construct, needing no power or attention in use.

In the NASA sterilizer, water flows through a high concentration of silver ions contained in a cation exchange resin. If bacteria are present, their exposure to

the silver ions results in bacteriological action leading to the killing of the bacteria. In practice a mixture of three resins, compounded in the form of a cartridge, has proved to be the most efficient cation exchange resin for the impregnation of the silver ions. The technique was tested in the Apollo water system under simulated operating conditions with known quantities and types of bacteria. The results showed that the contaminating organisms were effectively sterilized.

This innovation will be of interest to manufacturers of self-contained drinking water supply systems - such as those used in aircraft and vehicles. It will also find a use in individual applications such as refineries.

Note:

Requests for further information may be directed to:

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No patent action is contemplated by NASA.

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