



Microscopic fluorescent red anammox cells in wastewater



Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

Novel Anammox Bacteria for Wastewater Treatment

Disclosed is a novel anammox bacterium isolate *Candidatus Brocadia caroliniensis*, having Accession Deposit Number NRRL B-50286, and the characteristics of oxidizing ammonia and releasing di-nitrogen under anaerobic conditions. Also disclosed are methods for treating wastewater using said isolate.

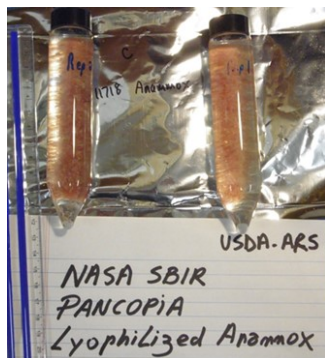
The novel anammox bacteria was isolated from livestock manure sludges at the ARS laboratory in Florence, SC. The high nitrogen removal rate obtained with NRRL B-50286 of more than 1.7 kg N/m³ reactor/day is optimum for wastewater treatment applications.

The novel bacterial strain *Candidatus Brocadia caroliniensis* of this invention (United States Patent 8,574,885 by Vanotti, Szogi and Rothrock) can be used for the treatment of wastewater having undesirable levels of ammonia, including agricultural, industrial, municipal or space wastewaters.

The anammox process uses 60% less oxygen, no carbon, and is only one-third the cost of conventional biological nitrogen removal systems. Anammox can also be freeze dried for long-term preservation and quick reactivation. NASA worked with ARS and research partner Pancopia, Inc., to develop a water recycling system that would help them save money and water in space.

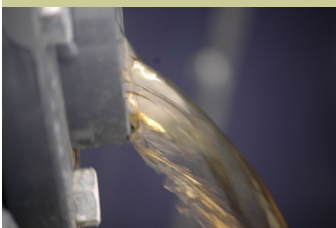


In 2018, USDA/ARS received the FLC National Award in Excellence in Technology Transfer for "Purification and Recycling Wastewater in Space and Decentralized Wastewater Systems".



Features and Benefits:

- **Anaerobic ammonium oxidizing bacteria**
- **For use in new deammonification process**
- **Removes nitrogen from wastewater at one-third the cost of existing technologies**
- **Suitable for the treatment of agricultural, industrial and municipal wastewaters**



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About the Research Organization

USDA/ARS delivers scientific solutions to national and global agricultural challenges. The technology was developed at the ARS Coastal Plains Soil, Water and Plant Research Center in Florence, SC. An important part of the Center's mission is development of treatment technologies to better manage manure from swine, poultry, and dairy operations to reduce releases to the environment of odors, pathogens, ammonia, and greenhouse gases as well as to maximize nutrient recovery.

Center inventions include: a high-performance nitrifying sludge, novel anammox bacterium isolate, recovery of ammonia from manure using gas permeable membranes, recovery of phosphorus from liquid and solid manures, recovery of proteins from wastes, and integrated systems of treatment technologies.