



Microscopic fluorescent red anammox cells in wastewater

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 anammox bacterium isolate.

The novel anammox bacteria was isolated from livestock manure sludges at the ARS laboratory in Florence, SC. This bacteria is capable of reactivation after lyophilization. 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 B2 – Issued November 5, 2013) may be used for the treatment of wastewater having undesirable levels of ammonia, including agricultural, industrial, or municipal wastewaters.

Compared to conventional biological nitrogen removal methods, the anammox process can save more than 50% of the oxygen supply and 100% of the external carbon source for denitrification. This leads to a significant decrease in operational costs. In addition, by-products of anammox do not include greenhouse gases.

ARS seeks a commercial partner to bring this technology to market.

Features and Benefits:

- Anaerobic ammonium oxidizing bacteria
- For use in new deammonification process
- Reduces half the aeration needs
- Suitable for the treatment of agricultural, industrial and municipal wastewaters



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About the Research Organization

The technology was developed at the USDA/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: simultaneous solid liquid separation, a high-performance nitrifying sludge, enhanced biological nitrogen treatment by anammox, recovery of ammonia from manure using gas permeable membranes, recovery of phosphorus from liquid and solid manures, and integrated systems of treatment technologies.

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