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IMMOBILIZATION OF ANAMMOX BACTERIA ON AGRONONWOVEN MODULES: A SUSTAINABLE APPROACH FOR ENHANCED NITROGEN REMOVAL

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Abstract

The need to reduce the demand for electricity by equipment installed at wastewater treatment plants has led to the development of ammonium nitrogen removal technologies in full nitrification/anammox systems. However, implementing anammox bacteria poses several difficulties, including excessively low wastewater temperatures in winter, fluctuating ammonium nitrogen concentrations and highly variable municipal wastewater composition. Another barrier to the implementation of anammox bacteria for widespread use is their slow growth and ease of leaching from process equipment. The solution was improved by using three newly constructed modules to immobilize anammox bacteria, using agrononwovens for the first time. The vacuum pump was used to force the wastewater through the modules. The experiment consisted of two stages: immobilization and laboratory culture. Immobilization lasted for 14, 36, and 49 days and culture for 95, 77, and 63 days respectively. Molecular studies using 16s rRNA amplicon sequencing demonstrated the presence of anammox bacteria from the *Ca*. Brocadia family in the nonwoven layers. A reduction in nitrogen compounds was also observed throughout the study. The research showed the utility of agrononwoven in terms of immobilized and cultured bacteria, including anammox bacteria.

Key words: agrononwoven, anammox, LIVE/DEAD, next-generation sequencing

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