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"Gheorghe Asachi" Technical University of Iasi, Romania

CODIGESTION OF RICE WASTEWATER WITH COW MANURE FOR ENHANCED BIOGAS PRODUCTION AND DIGESTATE QUALITY

Srisowmeya Guruchandran, Chakravarthy Muninathan, Nandhini Devi Ganesan*

Centre for Food Technology, Department of Biotechnology, Anna University, Chennai – 600025

Abstract

This study was aimed at resolving the challenges associated with the management of rice wastewater via anaerobic digestion. The innate potential of rice wastewater and cow manure for biogas production and digestate quality was assessed with minimal process parameter control understand the associated challenges. This study reveals that rice wastewater ratio of 25 (%v/v) was optimal with the maximum biogas yield of 266 mL/g VS and a further increase in the concentration resulted in the pickled reactor due to the accumulation of volatile fatty acids. This biogas yield was observed to be 31.2% higher than the reactor with 100% cow manure. Similarly, the biomethane yield was 1.46 times higher with the maximum methane content of 69%. The fertilizer potential of the digestate was assessed, and the characterization of digestate revealed that an addition of 25 (%v/v) of rice wastewater improved the digestate quality in terms of potassium by 66.29% and phosphate by 50%. The findings of this study aid in adopting further strategies to improve the yield and performance from instinctive efficiency.

Keywords: anaerobic digestion, bio-fertilizers, biogas, phosphate, rice wastewater.

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* Authors to whom all correspondence should be addressed: e-mail: projectsagnlabs@gmail.com; Phone: 044 22358378