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**Sugarcane Vinasse Treatment by Two-stage Anaerobic Membrane Bioreactor:
Effect of Hydraulic Retention Time on Changes in Efficiency, Biogas Production
and Membrane Fouling**

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Abstract

This research investigated the effect of hydraulic retention time (HRT) on two-stage anaerobic membrane bioreactor (2-SAnMBR) performance treating sugarcane vinasse. The experimental setup consisted of an upflow acidogenic reactor and a continuous stirred methanogenic reactor, fitted with submersed microfiltration hollow-fiber membranes. The results indicated excellent performance and robustness of 2-SAnMBR. The reduction in HRT of 5.3 to 3.1 days did not cause loss of its performance. The 2-SAnMBR showed high capacity of removing organic matter (97%), producing biogas (6.3 Nm³ of CH₄ per m³ of treated vinasse) and did not completely remove important nutrients to fertigation. Reducing the HRT, the average mass of soluble microbial products (SMP) and extracellular polymeric substances (EPS) per mass of mixed liquor volatile suspended solids (MLVSS) increased. Consequently, the transmembrane pressure (TPM) rate and fouling resistance rise. Despite the fouling effect, physical and chemical cleaning processes were able to recover operational permeability.

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