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FEASIBILITY OF EFFICIENT COD REMOVAL OF SIMULATED DOMESTIC SEWAGE FROM INLAND SHIPS IN SINGLE-STAGE CSTR UNDER MICROAEROBIC CONDITION

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Abstract

To improve domestic sewage treatment technology applied on inland ships, the feasibility of processing in simplified single-stage continuous stirred tank reactor (CSTR) under microaerobic condition was assessed in this study. With an optimized hydraulic retention time of 24 hours, the system's oxidation-reduction potential fluctuated between -329~-171 mV. The minimum effluent chemical oxygen demand was 39 mg/L, corresponding to a degradation efficiency of 96.9% on 106 d. The maximum removal rate of total nitrogen was 77.1%. Analysis of microbial diversity indicated higher community abundance in the intermediate and late stages, dominant microflora changed from *Betaproteobacteriales* (53.0%) and *Flavobacteriales* (22.9%) to *Saccharimonadales* (average of 76.6%) on order level. This study validated the feasibility of effectively treatment high-concentration simulated ship sewage using a single-stage CSTR under microaerobic conditions. The findings provide a foundation for the development low-energy, high-efficiency sewage treatment technologies and equipment suitable for small vessels operating inland rivers.

Key words: COD removal, continuous stirred tank reactor, domestic sewage, inland ships, microaerobic condition

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