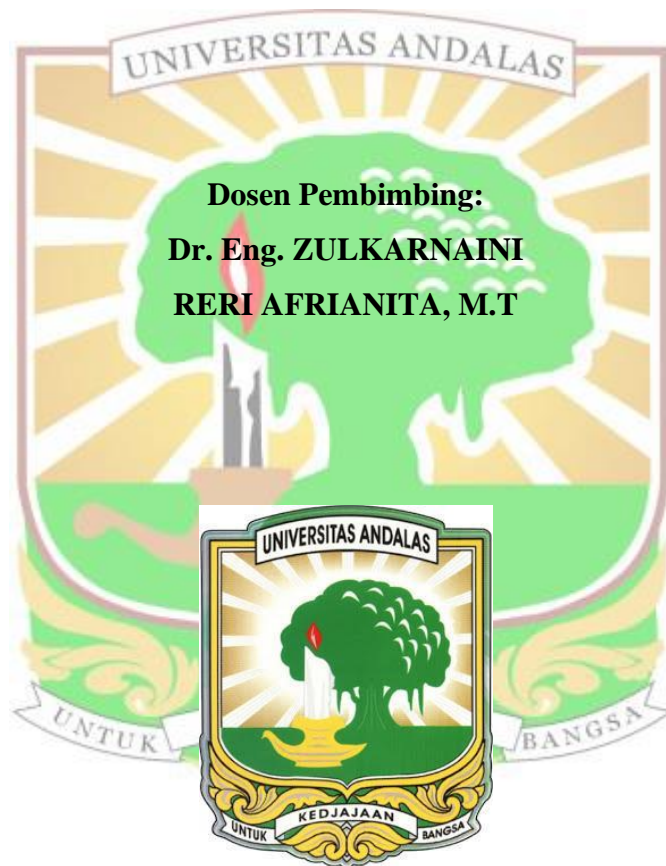


**PENYISIHAN NITROGEN DENGAN *TIDAL FLOW CONSTRUCTED*
WETLANDS MENGGUNAKAN BAKTERI ANAMMOX DAN TANAMAN
*EQUISETUM HYEMALE***

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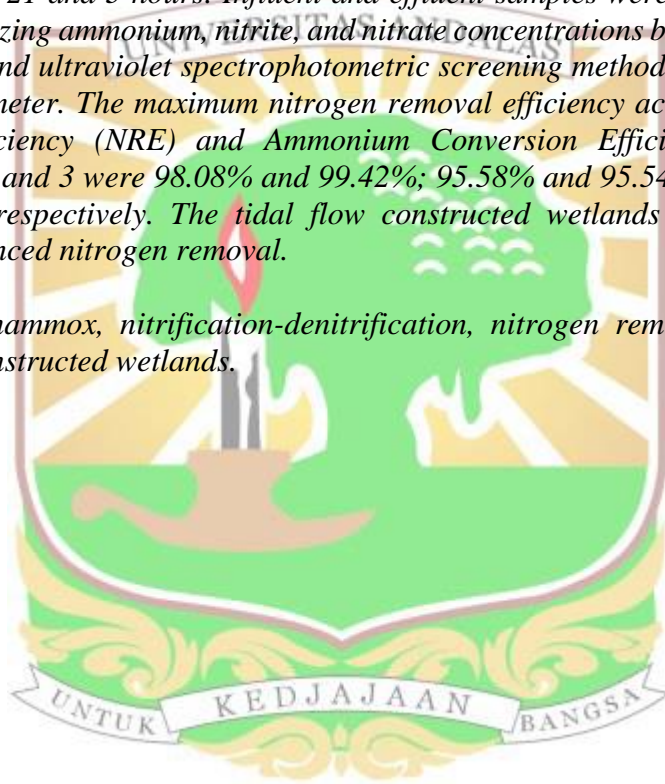


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ABSTRACT

*This study aims to analyze the performance of tidal flow constructed wetlands in nitrogen removal by anammox and nitrification-denitrification processes for 65 days. The experiment was conducted in three reactors, and each reactor contained zeolite and pumice. Reactor 1 was added with anammox bacteria species *Candidatus Brocadia fulgida* and sediment from the Penjalinan estuary as a source of Ammonium-Oxidizing Bacteria (AOB); Reactor 2 was added sediment from the Penjalinan estuary as a source of nitrifying-denitrifying bacteria and Reactor 3 just contained zeolite and pumice as control. Reactor 1 and Reactor 2 were planted with *Equisetum hyemale*. The experiment used artificial wastewater with an ammonium concentration of 70 mg-N/L, which was flowed tidally using a pump. The filling cycle was set with a digital timer switch stop contact that consisted of flooded and dry periods of 21 and 3 hours. Influent and effluent samples were collected 2-3 a week for analyzing ammonium, nitrite, and nitrate concentrations based on Nessler, colorimetric and ultraviolet spectrophotometric screening method using a UV-Vis Spectrophotometer. The maximum nitrogen removal efficiency achieved Nitrogen Removal Efficiency (NRE) and Ammonium Conversion Efficiency (ACE) in Reactors 1, 2, and 3 were 98.08% and 99.42%; 95.58% and 95.54%; and 92.03% and 93.62% respectively. The tidal flow constructed wetlands with anammox bacteria enhanced nitrogen removal.*

Keywords: *Anammox, nitrification-denitrification, nitrogen removal, tidal flow constructed wetlands.*



ABSTRAK

Penelitian ini bertujuan untuk menganalisis kinerja tidal flow constructed wetlands dalam penyisihan nitrogen melalui proses anammox dan nitrifikasi-denitrifikasi selama 65 hari. Percobaan menggunakan tiga reaktor dan setiap reaktor berisi zeolit dan batu apung. Reaktor 1 ditambahkan bakteri anammox species *Candidatus Brocadia fulgida* dan lumpur Muara Penjalinan sebagai sumber Ammonium-Oxidizing Bacteria (AOB), Reaktor 2 ditambahkan lumpur Muara Penjalinan sebagai sumber bakteri nitrifikasi-denitrifikasi dan Reaktor 3 hanya berisi zeolit dan batu apung sebagai kontrol. Reaktor 1 dan Reaktor 2 ditanam *Equisetum hyemale*. Percobaan menggunakan limbah artifisial dengan konsentrasi amonium 70 mg-N/L yang dialirkan secara pasang surut menggunakan pompa yang diatur dengan stop kontak timer digital dengan periode tergenang dan kering selama 21 dan 3 jam. Sampel influen dan efluen dikumpulkan 2-3 kali seminggu untuk menganalisis konsentrasi amonium, nitrit dan nitrat masing-masing secara Nessler, kolorimetrik dan screening spektrofotometri ultraviolet menggunakan Spektrofotometer UV-Vis. Efisiensi penyisihan nitrogen maksimal dengan parameter Nitrogen Removal Efficiency (NRE) dan Amonium Conversion Efficiency (ACE) pada Reaktor 1, 2, dan 3 adalah 98,08% dan 99,42%; 95,58% dan 95,54%; serta 92,03% dan 93,62%. Tidal flow constructed wetlands dengan bakteri anammox meningkatkan penyisihan nitrogen dibandingkan dengan nitrifikasi-denitrifikasi.

Kata kunci: Anammox, nitrifikasi-denitrifikasi, penyisihan nitrogen, tidal flow constructed wetlands

