

INFLUENCE OF TEMPERATURE ON NITRIFICATION OF DIGESTED BLACK WATER

G. Atuga¹, P. Lamers² and T. Fernandes³

¹Kenya Marine and Fisheries Research Institute, Mombasa, Kenya

^{1,2}Wageningen University, The Netherlands

³Netherlands Institute of Ecology

Email: atuga2004@yahoo.com

Abstract

Previous studies have shown that algae *Chlorella sorokiniana* cannot be able to grow in Digested Black Water (DBW) (faeces and urine) media due to high concentration of nitrite (NO₂--N) an intermediary product of nitrification. For utilization of *Chlorella sorokiniana* for wastewater treatment i.e. for Nitrogen (N) and Phosphorus (P) removal understanding conditions necessary to achieve complete nitrification of ammonia (NH₄+--N) to nitrate (NO₃--N) without accumulation of the toxic intermediary compound nitrite (NO₂--N) is needed. The Objective of this study was to investigate the effect of temperature on nitrification process of DBW. In this experiment DBW-fed photo-bioreactors was run and NH₄+--N, NO₂--N, and NO₃--N were evaluated at various temperature Ranges (25oC, 30oC, and 35oC). It was observed that nitrite accumulation increased with increase in temperature. NO₂--N concentration was 250 mg/l at 25oC, 450 mg/l at 30oC, and 600 mg/l at 35oC on day 28th, 29th and 16th respectively. These results suggest that increase in temperature leads to increase in conversion of NH₄+--N to NO₂--N with decrease in NO₃--N formation from NO₂--N. Further research is needed on DBW by perturbing other conditions that affect nitrification such as dilution rate, light intensity and pH to understand conditions that favors complete nitrification at aforementioned temperatures.

Key words: Digested black water, nitrification, nitrite and nitrate, temperature