Environment Protection Engineering

Vol. 43 2017 No. 1

DOI: 10.5277/epe170106

CHI-CHIN HWANG[1], CHIH-HUANG WENG[2]

KEY FACTORS CONTRIBUTING TO SIMULTANEOUS NITRIFICATION-DENITRIFICATION IN A BIOLOGICAL AERATED FILTER SYSTEM USING OYSTER SHELL MEDIUM

Factors contributing to nitrogen removal in a biological aerated filter (BAF) using oyster shell medium have been investigated. The system was operated in parallel with a bio-ball filter. Both filters were fed with a synthetic domestic wastewater containing approximately 25 mg N/dm^3 of total nitrogen (TN). The COD of wastewater was 200 mg O_2/dm^3. The sizes and dissolved oxygen (DO) of the voids within both filters were measured. Results indicated that the oyster shell system performed better with a nitrogen removal of 64.3%. The two systems exhibited a similar COD removal efficiency of approximated 80%. The oyster shell filter showed higher degree of variability in both sizes and DO levels of its void spaces. The condition provided a favorable environment for nitrogen removal through simultaneous nitrification and denitrification (SND). The release of carbonates from oyster shells were minimal, as judged from mass balance analysis of the system using calcium. It is concluded that the function of a SND reactor can be enhanced by using non-uniform filter media such as oyster shells. On the other hand, alkalinity is not a major concern when treating wastewaters with moderate ammonia concentration, such as that of domestic wastewaters.

1. INTRODUCTION

Due to ever-growing discharge of nutrients from point and non-point sources, eutrophication has become a global concern for the health of ecosystems in both inland and coastal waters. To minimize the impacts, nutrient removal has become a common practice in the treatment of wastewater from domestic, as well as industrial sources. Biological processes using microorganisms are currently the most cost-effective technology in wastewater treatment. Nitrogen has several oxidation states which provide

[1]Department of Ecoscience and Ecotechnology, National University of Tainan, Tainan 70005, Taiwan.

[2]Department of Civil and Ecological Engineering, I-Shou University, Kaohsiung 84008, Taiwan, corresponding author C.-H. Weng, e-mail: chweng@isu.edu.tw

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The effect of dissolved oxygen concentration on nitrification

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Nitrogen removal from synthetic wastewater by simultaneous nitrification and denitrification (SND) via nitrite in an intermittently aerated reactor

Study of municipal wastewater treatment with oyster shell as biological aerated filter medium

The effect of water purification by oyster shell contact bed

Recycling waste oyster shells for eutrophication control

Simultaneous Nitrification-Denitrification in a Contact Aeration System Using Different Media for the Treatment of Swine Wastewater

Estimation of oyster shell surface area using regression equations derived from aluminum foil molds

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Improved simultaneous nitrification and denitrification in a single reactor by using two different immobilization carriers with specific oxygen transfer characteristics

Evaluating the effect of dissolved oxygen on simultaneous nitrification and denitrification in polyurethane foam contact oxidation reactors

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Simultaneous nitrification/denitrification in a biofilm airlift suspension (BAS) reactor with biodegradable carrier material