

## Effect of Sulfur Particle Size and Amount and Methanol Concentration on Autotrophic Sulfur Denitrification

(황을 이용한 독립영양탈질에서의 황입자 크기 및 양, 메탄올 농도의 영향)

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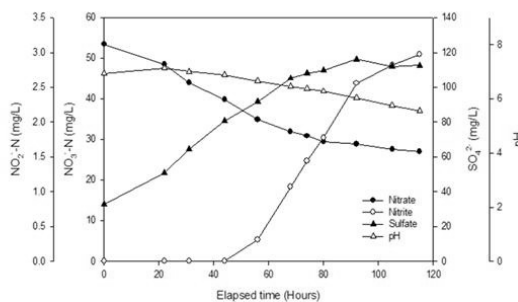
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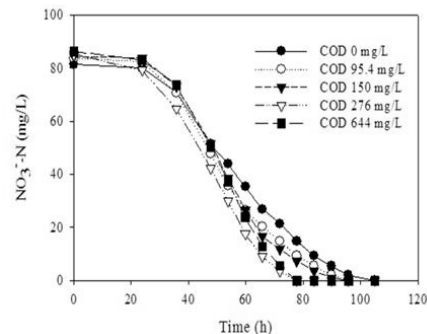
Nitrate at high concentration in wastewater needs to be treated by the denitrification process before being released into aquatic environment. In this study, sulfur particle was used as an electron donor for growing sulfur denitrifying bacteria (SDB), and nitrate was reduced and removed from water by being used as a final electron acceptor by SDB. A significant pH drop was observed in the denitrification process which suggests that pH control is required for complete and efficient nitrate removal. In fact, with an addition of shell for maintaining pH, a higher rate of nitrate removal was obtained. The fastest nitrate removal was obtained with 200g of sulfur, and a complete removal of 80mg/L nitrate obtained within 100 hours. As the size of sulfur particle was reduced, nitrate removal rate was increased. The sulfur particle size less than 2 mm showed the fastest nitrate removal rates at 0.83 mg/L/hr. The methanol addition at the concentration up to 644mg/L didn't inhibit the denitrification process, but instead it enhanced nitrate removal.

**Keywords :** Autotrophic denitrification, Heterotrophic denitrification, Nitrate removal, Sulfur oxidizing bacteria, Sulfur particle

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**Fig. 1.** Removal of nitrate (Without buffer addition).



**Fig. 2.** Nitrate removal in the presence of Methanol.