

Bioelectrochemical denitrification using *Ochrobactrum anthropi* SY509

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Biological denitrification among various denitrification methods is very attractive because of economical and environmental advantages. However, carbon source feeding is required to maintain biological activity. We suggested bioelectrochemical method, where permeabilized cell was used without feeding carbon source. Also, cell had a good biocatalytic activity due to its permeability which enzymes located in cell membrane and periplasmic space. Denitrification was carried out by permeabilized *Ochrobactrum anthropi* SY509 containing denitrifying enzymes; nitrate reductase, nitrite reductase, nitrite reductase, nitric oxide reductase and nitrous oxide reductase. In this system, biocatalytic reaction was coupled with mediator reaction on the electrode surface where electrons transferred to the biocatalyst. Carbon nanoparticle was chosen as a support material to immobilized the mediator, neutral red, because small mediator molecule is difficult to immobilize in the electrode. And the electrode surface area can be increased by carbon nanoparticle, having good conductivity. Neutral red was immobilized by two methods like direct and indirect using linker. When the permeabilized cell and the indirectly immobilized mediator were immobilized on the carbon felt electrode, high denitrification efficiency was obtained compare to directly immobilization and the mediator leakage was prevented.