Effects of oxidation-reduction potential for biological denitrification using packed-bed reactor

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The effects of oxidation-reduction potential (ORP) were investigated in the packed-bed reactor for nitrate removal from wastewater. By observing the relationship between ORP and the activity of denitrifying enzymes, it was found that the efficiency of denitrification was higher, when the ORP level was lower. The method associated with controlling the initial ORP level was suggested to enhance the efficiency of denitrification and the activities of denitrifying enzymes. In the packed-bed reactor, the influent ORP value affected the denitrification efficiency similarly with the batch reactor. In two-stage packed-bed reactor, since the influent ORP value was decreased in the first reactor, the higher denitrification efficiency was obtained in the second reactor. To improve the denitrification efficiency, recycled packed-bed reactor system was suggested and investigated. As a result of recycle, denitrification efficiency increased, because the influent ORP was lowered and influent nitrate concentration was decreased through recycling of effluent. The details will be discussed.