# Removal of Nitrogen, Phosphorus, and Organic Pollutants From Water Using Seeding Type Immobilized Microorganisms[1]

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**Objective** To study the possibility of removing nitrogen, phosphorus, and organic pollutants using seeding type immobilized microorganisms. **Methods** Lakes P and M in Wuhan were chosen as the objects to study the removal of nitrogen, phosphorus, and organic pollutants with the seeding type immobilized microorganisms. Correlations between the quantity of heterotrophic bacteria and the total nitrogen (TN), total phosphorus (TP), and total organic carbon (TOC) in the two lakes were studied. The dominant bacteria were detected, inoculated to the sludge and acclimated by increasing nitrogen, phosphorus and decreasing carbon source in an intermittent, time-controlled and fixed-quantity way. The bacteria were then used to prepare the seeding type immobilized microorganisms, selecting diatomite as the adsorbent carrier. The ability and influence factors of removing nitrogen, phosphorus, and organic pollutant from water samples by the seeding type immobilized microorganisms were studied. **Results** The coefficients of the heterotrophic bacterial quantity correlated with TOC, TP, and TN were 0.9143, 0.8229, 0.7954 in Lake P and 0.9168, 0.7187, 0.6022 in Lake M. Ten strains of dominant heterotrophic bacteria belonging to *Pseudomonas*, *Coccus*, *Aeromonas*, *Bacillus*, and *Enterobateriaceae*, separately, were isolated. The appropriate conditions for the seeding type immobilized microorgansims in purifying the water sample were exposure time=24 h, pH=7.0-8.0, and quantity of the immobilized microorganisms=0.75-1g/50 mL. The removal rates of TOC, TP, and TN under the above conditions were 80.2%, 81.6%, and 86.8%, respectively. **Conclusion** The amount of heterotrophic bacteria in the two lakes was correlated with TOC, TP, and TN. These bacteria could be acclimatized and prepared for the immobilized microorganisms which could effectively remove nitrogen, phosphorus, and mixed organic pollutants in the water sample.

**Key words**: Heterotrophic bacteria; Acclimation; Immobilized microorganisms; Nitrogen; Phosphorus; Mixed organic pollutants

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