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INNPT Nano Particles Material Technology as Enhancement Technology for Biological WWTP Performance and Capacity

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Abstract : Wastewater treatment became a big issue in this decade due to shortage of water resources, growth of population and modern live requirements. Reuse of treated wastewater in industrial and agriculture sectors has a big demand to substitute the shortage of clean water supply as well as to save the eco system from dangerous pollutants in insufficient treated wastewater In last decades, most of wastewater treatment plants are built using primary or secondary biological treatment technology which almost does not provide enough treatment and removal of phosphorus and nitrogen. those plants which built ten to 15 years ago also now suffering from overflow which decrease the treatment efficiency of the plant. Discharging treated wastewater which contains phosphorus and nitrogen to water reservoirs and irrigation canals destroy ecosystem and aquatic life. Using chemical material to enhance treatment efficiency for domestic wastewater but it leads to huge amount of sludge which cost a lot of money. To enhance wastewater treatment, we used INNPT nano material which consists of calcium, aluminum and iron oxides and compounds plus silica, sodium and magnesium. INNPT nano material used with a dose of 100 mg/l to upgrade SBR treatment plant in Cairo Egypt -which has three treatment tanks each with a capacity of 2500 cubic meters per day - to tertiary treatment level by removing Phosphorus, Nitrogen and increase dissolved oxygen in final effluent. The results showed that the treatment retention time decreased from 9 hours in SBR system to one hour using INNPT nano material with improvement in effluent quality while increasing plant capacity to 20 k cubic meters per day. Nitrogen removal efficiency achieved 77%, while phosphorus removal efficiency achieved 90% and COD removal efficiency was 93% which all comply with tertiary treatment limits according to Egyptian law.

Keywords : INNPT technology, nanomaterial, tertiary wastewater treatment, capacity extending
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