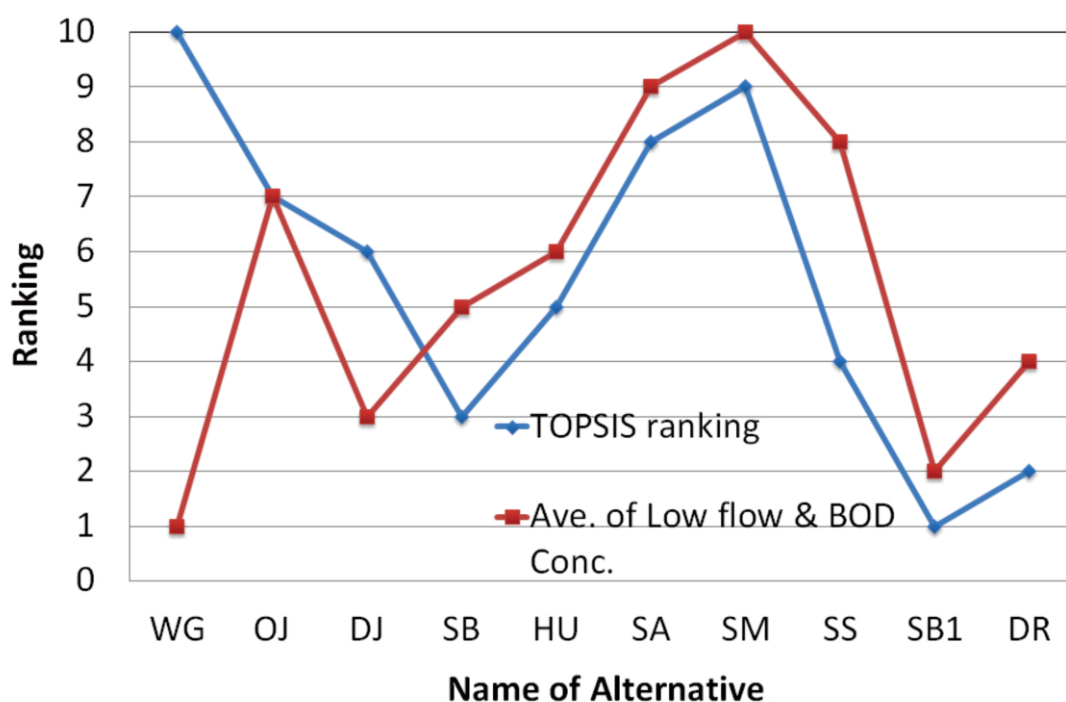




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Invited Speech:

Title: Role and Performance of Membrane Bioreactors in Nutrients Removal and Recovery from Wastewater

Speaker: Prof. Chia-Yuan Chang, Chia Nan University of Pharmacy and Science

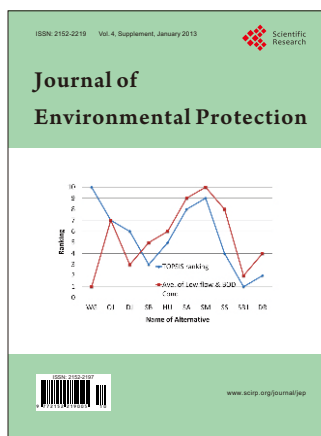
Abstract

A worldwide depletion of phosphorus resources is taking place and it is estimated that phosphorus demand has exceeded known reserves of rock phosphate. At the same time, the production and use of nitrogen fertilizers from natural gas has major greenhouse implications. These truths make the recovery and reuse of these nutrients an economic as well as an environmental necessity. The presence of nutrient (nitrate and phosphate) in the treated wastewater from municipalities and industries is often responsible for eutrophication.

In the past, several processes have been explored for nutrients removal and recovery from wastewater and normally, a process with biological (removal) –physicochemical (recovery) units was undertaken, for example, a conjunction of biological nutrient removal (BNR) and chemical precipitation or ion exchange unit. Biological unit usually could be the pretreatment of its sequent recovery unit but it may fail to achieve the required water quality when exposed to peak and variable organic load as the efficiency of a biological system strongly depends on operating parameters.

Membrane bioreactor (MBR) is an innovative technology which combines biodegradation together with membrane separation in a single process, thereby separating microorganisms and suspended solids from the treated water by membrane filtration. Recently, aerobic membrane bioreactor (AMBR) has been gaining lots of attentions for wastewater treatment in the aspects of better effluent quality and it's a promising technology to play as a pretreatment of nutrient recovery. On the other hand, anaerobic MBR (AnMBR) can be used not only for on-site wastewater treatment and energy generation, but generation of reusable water containing nutrients for agricultural applications. Furthermore, several hybrid MBR (HMBR) systems have been proposed for N and P recovery over the past decade. Particularly, some of the researches did not focus on phosphorus removal but only for carbon and nitrogen removals, by this way, phosphorus can be recovered from MBR permeate easily through ion exchange or chemical precipitation etc. since the permeate could be transparent and free from carbon and nitrogen.

This presentation introduces the current status of nutrients removal and recovery from wastewater using different membrane bioreactors such as AMBR, AnMBR and HMBR, and their existing operational and design challenges; possible applications and research directions.



Call for Papers

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