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Water treatments, needs and directions

The challenges in water management are among the most important problems faced by the world today. The shortage of clean water is at the heart of critical health issues in developing countries and is the focus of ecological and safety concerns even for the highly developed nations. To adequately provide water for drinking and agriculture, we must desalinate and clean natural water sources, reclaim polluted water, purify water with different degrees of contaminants and improve the effectiveness of water handling (storage and delivery) systems ranging from desalination plants to waste water treatment facilities and to home water purification systems. We must remove contaminants that include inorganics (metals and ions), organics (e.g. toxic waste, pharmaceuticals) and microorganisms (bacteria, viruses, etc.). At the heart of these diverse problems stands the need for new ways to clean water, to safely dispose of the extracted waste, to properly reuse the cleaning systems and to keep the environment clean. Israel made significant steps to provide affordable solutions, based on wide distribution system, desalination (close to 80% of the urban water consumption), tertiary treatment of wastewater for irrigation, drip irrigation for reduction of water consumption and improved agriculture techniques. However, there is always place for improvements. The directions may include improved membranes, improved desalination steps in order to reduce the cost, improve pretreatment processes, increased recoveries (near zero liquid discharge in brackish water desalination), increase product quality, improved wastewater treatment by better techniques like MBR and MBBR, better treatment for removal of tracers of organic contaminants, treatment of polluted aquifers, develop small water treatment and recovery for remote locations, reduce water losses on the piping systems and more.

Biography

Semiat R is a Professor in the Chemical Engineering Department, Technion, Haifa, Israel. He holds the Yitzhak Rabin Memorial Chair in Science, Engineering and Management. He has served as the Director of the Grand Water Research Institute and is in-charge of the Rabin Desalination Laboratory. He completed BSc degree in Chemical Engineering from the Technion in 1973 and DSc dissertation on MED Desalination in 1978 at the Technion. He is an expert in Separation Processes with industrial experience. He joined the Chemical Engineering Department, Technion, in 1990. His main research interests are: process development; separation processes with emphasis on desalination. Of relevance are the research subjects associated with membranes processes and membrane fouling prevention. Most of his current research subjects are associated with the industry.

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