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The role of nanotechnology in treated waste water recycling and reuse: Effluent quality and economic aspects

Recycling and reuse of the nonconventional water resources such as wastewater is a practical solution for solving water shortages. However, the treatment level and the effluent quality is still an open question. Due to the climate changes, randomized precipitation and over pumping of groundwater there are only small chances that scarcity issues will be solved. Floods water scarcely fills the increasing gap between supply and demand. The regions suffering from water shortage and shortage in food production will probably continue to stay under scarce conditions unless special and big measures will be undertaken.

A promising solution is to desalinate low quality waters such as sea water, saline groundwater and wastewater. The effect of domestic wastewater after being treated by conventional methods and subsequently by nanotechnology is a promising solution. Although the main nanotechnology desalination suffers from adverse phenomena such as high energy demand, membranes fouling associated with decrease in flowrates and disposal of the brine, is the promising solution for coming century.

Field experiments were conducted in a typical arid zone (precipitation around 150 mm/year). The experiments lasted

four years and different species of annual agricultural crops were cultivated in 0.6 hectare plots. The field trial consisted of 6 different treatments where the yield was monitored every growing season in each of them. Each effluent quality and the operating parameters of the nanotechnology system such as transmembrane pressure, retentate and recirculation flow-rates including salinity effects on productivity of agricultural crops were continuously monitored. Also were monitored the operation membrane system. The effects of water quality, expressed mainly by the Electrical Conductivity (EC) of the effluent were monitored and considered. During the ongoing experiment an economic analysis was conducted, examining the effects of water and energy consumption on fouling and the costs affecting the efficiency of the effluent application.

Speaker Biography

Gideon Oron has completed his D.Sc. studies in the Technion - Israel Institute of Technology in the area of Water Engineering. After a postdoc period in Ft. Collins (Co., USA) he joined Blaustein Institute for Desert Research (BIDR), Kiryat Sde-Boker as researcher. His activity is mainly managed around efficient use of waters in dry regions. His activity in the general area of water resources includes looking at the reuse of wastewater, runoff water and related economic aspects.

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