

Self-Cleaning Advanced-Treatment Filter for Effluents (Safe): Innovative Development, Design And Application For An Efficient Treatment of Secondary Effluents of Wastewater Treatment Plants

Abstract

Water shortage in Palestine is an ominous threat for the 21st century that requires an integrated water resources management. Treated wastewater is one candidate as dependable source of water. This research mainly aims at developing an innovative carbon-filtration unit for post treatment of secondary effluents of wastewater treatment plants(WWTPs) in order to be reused for irrigation and ground water recharge. The filter innovation is about enhancing the efficiency of contaminants removal at a prolonged operational service time without the need for regeneration and cleaning of the filter media. An experimental setup of WWTP and filtration unit was designed, assembled and operated for the treatment of wastewater generated from Nablus city. BOD, turbidity, and Fecal Coliform removal efficiencies exceeded 99% most of the time. Self-cleaning action is proposed for future research by augmenting the carbon media of the filter with pre-deposited nanomaterials for continuous conversion of most of the captured contaminants, such as organics, into gases. Successful development of such filters will ensure a longer-run and efficient filters, with low capital and operational costs, and less energy and maintenance requirements. Due to the expected working behavior of the filter, it was named as SAFE.