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Pr. Dr. Ing.- Jan Hoinkis conducted a doctorate in thermodynamics at the University of Karlsruhe, Germany (now Karlsruhe Institute of Technology). After completion of his thesis he moved to the Swiss company Ciba-Geigy, where he was working as head of a R&D group on process development in the field of fine chemicals production with focus on environmentally friendly technologies. He has been working since 1996 as a professor at the Karlsruhe University of Applied Sciences giving lectures in chemistry, thermodynamics as well as environmental process engineering. His R&D work is focused on water treatment and water reuse with special attention on membrane technologies. He was project coordinator of several national and international R&D projects and he is currently coordinating a European research project (FP7). In 2008 he was appointed Scientific Director of the Institute of Applied Research, which is the central research facility at the Karlsruhe University of Applied Sciences.

Novel low-fouling membranes for treatment of textile dye wastewater using submerged membrane bioreactor (MBR) process

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Abstract

Since water scarcity is a growing problem particularly in the Middle East and Northern African countries (MENA) the use of alternative water resources will be more important in near future. In this context reuse of treated wastewater offers a viable option to reduce freshwater consumption. The textile industry which plays an increasingly important role in MENA countries is long regarded as a water intensive sector due to its high demand of water for all parts of its processes. Membrane bioreactor (MBR) systems are very attractive for industrial wastewater treatment as the implementation of membrane micro/ultra-filtration for solids retention into biological treatment system leads to several substantial improvements compared to conventional biological processes (Brik et al., 2006).

This paper presents findings of an EU funded project “Development of the next generation membrane bioreactor system (BioNexGen, 2013) which aims at developing novel functionalized low-fouling membranes for membrane bioreactors (MBRs) in wastewater treatment.

The results were obtained in a small pilot-scale submerged membrane bioreactor treating model textile dye wastewater (MTDW). The MBR was equipped with adequate sensors as well as LabVIEW (National Instruments) data acquisition system in order to monitor performance. The hydraulic volume of the employed MBR reactor was 57 L. A novel hydrophilic nanostructured membrane layer has been developed as special coating on a commercial membrane. For this purpose the layer has been casted on an UF membrane (PES). The commercial as well as the novel module consisted of 3 sheets, with 25 cm × 25 cm dimensions of each sheet covering total active membrane area of 0.33 m².

www.bionexgen.eu, accessed on 10th December 2013

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