

Elimination of micro pollutants by the combination of powder activated carbon and membrane technology

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Abstract

Micro pollutants such as pharmaceuticals, biocides etc. enter the aquatic environment in various ways. They are detected by modern measuring methods in very small concentrations even in drinking water or in food. Since wastewater treatment plants in Germany are important point sources for micro pollutants in waterbodies, the contribution of wastewater treatment plants to the protection of the aquatic environment is discussed openly. A further treatment surely is beneficial, but is associated with higher costs. Emschergenossenschaft and Lippeverband are involved in this discussion and already operate wastewater treatment plants with treatment stages for the elimination of micro pollutants. In addition to the large-scale plants, EGLV, in cooperation with research institutes and companies, are operating various pilot plants to test new treatment procedures and gain operational experience.

The focus of this paper is on the investigations conducted by EGLV concerning the combination of powdered activated carbon and membrane technology. By direct dosing of powder activated carbon into the membrane bio reactor (MBR) of the hospital wastewater treatment plant of the Marienhospital Gelsenkirchen, the freight of micro pollutants could be reduced. A MBR-pilot plant from GE Water & Process Technologies GmbH, which was operated at the Emschergenossenschaft's testing facility, also showed that the powder activated carbon has a positive effect on the permeability of the membranes. Similar effects were observed in the operation of a pilot plant from Microdyn Nadir, in which powder activated carbon was dosed into the membrane chamber charged with conventional cleaned water from the Hünxe waste water treatment plant. The membrane fouling was reduced with increasing PAC concentration in the membrane chamber. The use of PAC seems to be somewhat more efficient with regard to micro pollutant elimination in the downstream processes.