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Abstract
A recently started PhD study is focused on the introducing of advanced water treatment technology to the Danish water sector. The purpose of the study is to present a novel option for removing pesticides from drinking water, as an alternative to the two traditional solutions of either using activated carbon (GAC/PAC) or the costly process of establishing a new well.

The access to clean drinking water is by many considered to be a universal human right. However, due to both a quantitative and qualitative water crisis, it may be necessary to re-evaluate this belief. It is assessed that humans appropriate 54 % of the accessible renewable water resources today, and that at the same time the quality of water is deteriorating due to pollution with amongst other things micropollutants such as pesticides. (UN, Shiklomanov)
In Denmark, the pesticide treatment frequency for the agricultural sector, which indicates the pesticide load experienced by the environment, has in the period 1996 to 2010 increased from 1.92 to 2.8, in spite of political ambitions of reaching a level of 1.7. In the most recent survey of the quality of the Danish groundwater resources, pesticides were found in 36.8 % of the groundwater reservoirs, and above the 0.1 µg/L limit in 12.1 % of the cases. It is estimated that 50.1% of the groundwater reservoirs have been polluted with pesticides between 1990 and 2009, which has resulted in the closing down of on average 130 drinking water wells per year from 1999 to 2009. (GEUS, Danmarks Statistik)

The treatment method is planned to consist of a new approach to the use of advanced oxidation processes (AOPs). AOPs have been shown to be effective methods for degradation of otherwise stable pollutants that do not undergo biological degradation, and provide means for treating drinking water without addition of additional chemicals. One such example was a case study, of the application of immobilised TiO_2 to an already existing UV system at a waste water treatment plant in Vejle. Here the degradation of endocrine disrupting chemicals was investigated and compared to the effect on the disinfection process. Compared to the pure photolysis, the photocatalytic process with TiO_2 increased the rate of degradation of the endocrine disruptor with 39.7 %, showing the effectiveness of AOPs to degrade micropollutants. Furthermore, with TiO_2 coated surfaces, a 99.99 reduction in E. Coli concentration was achieved with an energy consumption of 0.15 kWh/m^3.
Although very effective, AOPs currently suffers from several issues. These are the possible formation of toxic by-product, long reaction time, and especially energy consumption. The project aims at tackling all of these issues.

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