WATER TREATMENT BY "CORFONA-ABOVE-WATER" TECHNOLOGY

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The goal of this study is to test the feasibility of "Corona above- water" technology for the treatment of drinking water. Experiments have been performed on the removal of the substances phenol, MTBE, NDMA and Geosmin from tap water. The presence of these substances in drinking water is expected to become problematic in the coming decade, and novel technologies need to be developed to control their concentrations and the products formed from treatment.

It is concluded that the Corona-Above-Water technology can be used to (partially) convert pollutants as MTBE, NDMA, Geosmin and phenol in water. Full mineralization of harmful target compounds is unnecessary and energetically inefficient. AOP's should be regarded as pre-treatment tool to (microbiological) degradation methods for polluted water flows, by reduction of initial harmful toxity.

The experiments showed the following results:
MTBE was reduced from a start concentration of 8 mg/L to a concentration of <3 mg/L at an energy cost of 115 J. This corresponds to a yield of 14 grMBTE/kWh.
NDMA can easily be converted, and was reduced from a start concentration 25 µg/L to a concentration of 1.3 µg/L, at an energy cost of 115 J. This corresponds to a yield of 74 mgNDMA/kWh.
Geosmin is more difficult to remove, compared to MTBE and NDMA. After 30 min the concentration is reduced from 0.31 to 0.17 µg/L, at an energy cost of 690 J. This corresponds to a yield of 73 µgGeosmin/kWh.
Phenol was reduced from a start concentration of 10 mg/L to a concentration of <2 mg/L, and an energy cost of 690 J. This corresponds to a yield of 4.4 gphenol/kWh.

MTBE and NDMA were not completely removed from the water, after some treatment time the concentration remains at a constant level. This can possibly be explained by the limited penetration of radicals and other excited species into the water layer. We expect much higher removal rates at a better mixing of radicals, e.g. by reducing the water layer thickness, or by circulating the water and/or the air through the reactor.