

International Conference and Expo on

# Water Microbiology & Novel Technologies

July 18-19, 2016 Chicago, USA

## Elimination of micro-pollutants and pathogenic (antibiotic resistant) bacteria by advanced waste water treatment technologies

Claudia Gallert and Stefanie Hess

University of Applied Science Emden Leer, Germany

Elimination of bacteria by ozonation in combination with adsorption onto activated carbon or slow sand filtration is a possibility for advanced sewage treatment in order to improve the quality of treated sewage and to reduce the potential risk for human health and of receiving surface waters. To determine the elimination of sewage bacteria, inflowing and leaving waste water of different treatment processes was analyzed in a culture-based and qPCR approach for its content of *Escherichia coli*, *Enterococci* and *staphylococci* and their resistance against selected antibiotics over a period of 17 months. For *Enterococci*, single species and their antibiotic resistances were identified. In comparison to the standard waste water treatment process, ozonation plus adsorption onto activated carbon and/or sand filtration reduced the concentrations of total and antibiotic resistant *E. coli*, *Enterococci* and *staphylococci*. However, antibiotic resistant *E. coli* and *staphylococci* apparently survived ozone treatment better than antibiotic sensitive strains. Neither vancomycin resistant *Enterococci* nor methicillin resistant *Staphylococcus aureus* (MRSA) were detected by a culture-based approach. The decreased percentage of antibiotic resistant *Enterococci* after ozonation may be explained by a different ozone sensitivity of species: *Enterococcus faecium* and *Enterococcus faecalis*, which determined the resistance-level, seemed to be more sensitive for ozone than other *Enterococcus* species. Overall, ozonation followed by adsorption onto activated carbon or sand filtration led to 0.8-1.1 log-units less total and antibiotic resistant *E. coli*, *Enterococci* and *staphylococci*. Thus, advanced waste water treatment after common sewage treatment is an effective tool for further elimination of microorganisms from sewage before discharge in surface water.

### Biography

Claudia Gallert is an Environmental Microbiologist with research experience of 25 years in the field of waste water and waste treatment, soil remediation and biotechnological production of value-added products. She has published more than 50 papers in peer-reviewed journals and she is also a member of different professional groups.

[claudia.gallert@hs-emden-leer.de](mailto:claudia.gallert@hs-emden-leer.de)

### Notes: