

Report of the EG Microbiology and Hygienics

2013

G. Kavka, A. Kirschner, G. Kasimir, A. Farnleitner

Meetings

Lectures at Meetings:

Farnleitner, A.H. (2012) Integrating Molecular Source Tracking into Target-Oriented Microbial Water Quality Management and Catchment Protection. 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg.

Reischer GH, et al & Farnleitner AH (2013) The Co-Evolution of Host and Intestinal Microbiota? – Towards a Unified System for Molecular Faecal Indication and Source Tracking. 2nd International IWA Conference on Water Research, 20.-23. Jänner, Singapore.

Farnleitner AH, Reischer GH, Wilhartitz, I, Ryzinska - Paier G, Sommer R, Stadler, H, Kirschner AKT & Mach, R.L (2013) The hidden life in alpine spring water - towards the extension of the current microbial water quality concept, "Seminar am Wilheminenberg" Medizinische Universität Wien, Department für Integrative Biologie und Evolution, eingeladener Vortrag.

Farnleitner AH (2013) Untersuchung und Bewertung der mikrobiologischen Qualität von Wasserressourcen: von der Hazard-Detektion zur Risikoabschätzung. Mikrobiologische Qualität von Trinkwasser – Neue Herausforderungen; ÖWAV & ÖVGW Tagung, Wien.

Publications

Following further publications appeared from members of IAD and the ICC Water and Health related to the River Danube Catchment:

Wilhartitz, I., Kirschner, A.K.T., Fischer, U.R., Wieltschnig, C., Brussaard, C., Stadler, H., and Farnleitner A.H. (2013) Occurrence and dynamics of natural viruses, heterotrophic nanoflagellates and prokaryotes in groundwater from alpine karst aquifers. *Microbiology Open*. (in press).

Stadler, H., R. Sommer, Kirschner, A.K.T., Reischer, G.H., Mach R.L., & Farnleitner, A.H. (2012) Neue Erkenntnisse zur mikrobiologischen Qualitätsdynamik an ausgewählten Karstquellen der Nördlichen Kalkalpen mittels automatisierter und feldtauglicher Untersuchungsmethoden. *Beiträge zur Hydrogeologie*, 59:95-108.

Schauer, S., R. Sommer, A.H. Farnleitner and A.K.T. Kirschner. Rapid and Sensitive Quantification of *Vibrio cholerae* and *Vibrio mimicus* Cells in Water Samples by Use of Catalyzed Reporter Deposition Fluorescence In Situ Hybridization Combined with Solid-Phase Cytometry. *Applied and Environmental Microbiology* (78) 20: 7369-7375 (2012)

Poster presentations

Sommer, R., A. Cabaj, G. Hirschmann, A.K.T. Kirschner, R. Schürhagl, Th. Haider & A.H. Farnleitner (2012) What means sufficient efficacy in terms of waste water disinfection by UV irradiation? 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg.

Schauer, S., R. Sommer, A. Farnleitner, A. Kirschner (2012) Solid phase cytometry as a tool for direct and rapid quantification of *Vibrio cholerae*/*Vibrio mimicus* in water samples. 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg

B. Steßl, L. Hallmann, S. Klinger, G. Reischer, A. Kirschner, A. Farnleitner, M. Wagner (2012) Isolierung und Typisierung von Zoonoseerregern aus Kotproben von Wildtieren im Ökosystem Au. 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg.

G. Ryzinska-Paier, T. Lendenfald, K. Correa, A. Blaschke, H. Stadler, A. Farnleitner (2012) Automated Glucuronidase assay for near real-time faecal pollution monitoring of water resources. 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg.

Vierheilig, J., A. Farnleitner, D. Kollanur, G. Blöschl, G. Reischer (2012) Lack in fecal specificity of genetic bacteroidetes assays for fecal pollution monitoring of water resources. 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg.

G. Reischer, N. Schuster, J. Vierheilig, A. Farnleitner (2012) Potential of Next Generation Sequencing (NGS) Methods for Water Quality Monitoring. 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg.

Frick, C., J. Vierheilig, G. Reischer, A. Kirschner, A. Farnleitner, R. Sommer (2012) Occurrence and abundance of bacterial standard faecal indicators for water quality monitoring in faeces of wildlife animals. 33. Jahrestagung der ÖGHMP, 21.-24. Mai, Salzburg

Mayer, R., Egle, L. Zessner, M., G. Reischer, Sommer, R. & A. Farnleitner (2012) Stability of indicators and markers for microbial faecal pollution in sewage at 4°C supports integrated sampling procedures at waste water treatment plants. 33. Symposium der ÖGHMP, 21.-24. Mai, Salzburg

Farnleitner AH, Reischer, G.H, Sommer R, Mach, R.L, Ryzinska Paier, G., Kirschner AKT, Stadler, H & W. Zerobin (2013) Microbiological Quality Management of Drinking Water Resources at all Time Scales: from Molecular Microbial Source Tracking to Near-Real-Time Water Abstraction Management. 2nd International Conference on Water Research der IWA, 20.-23. Jänner, Singapore.

Vierheilig J, Reischer GH, Farnleitner AH (2013) Elucidating Genetic Population Structures and Dynamics of Faecal Bacteria in Intestinal and Non-intestinal Habitats within a Complex Backwater System of a Large River. 2nd International Conference on Water Research der IWA, 20.-23. Jänner, Singapore.

Projects

A) The preparations for the Joint Danube Survey JDS 2013 have started.

Members of the IAD and the ICC Water and Health (www.waterandhealth) will contribute to the planned microbiological investigations during the Journey. It will be realized in August and September 2013. Microbiological Research will be mainly supported by a special FWF-project (P25817-B22), awarded to Alexander Kirschner and Andreas Farnleitner, with additional funding by ICPDR and the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management

FWF-project: Establishing the basic microbial faecal pollution pattern along a large river: testing the longitudinal continuum vs. lateral discontinuum hypothesis at the River Danube (duration: 6/2013 – 5/2015)

B) The Groundwater Resources Systems Vienna (GWRS-Vienna)

goes in his fourth year. The project is a cooperation between the ICC Water & Health (www.waterandhealth.at) and the IFUM, MA 39 (head Dr. Nadiotis-Tsaka). The project is developing, establishing and re-evaluating analytical methods and approaches required for (microbiological) water quality management of porous ground water resources within the complex of „large river – backwater interactions“ of the River Danube. The project is funded by Vienna Water (MA 31), the EU and realised in the frame of the FWF DKplus „Vienna Doctoral Programme on Water Resource Systems“

Recent Publications from the GWRS project

J. Derx, A.P. Blaschke, A.H. Farnleitner, L. Pang, & J. F. Schijven. (2013) Effects of river level fluctuation on virus removal by bank filtration - a numerical analysis *Journal of Contaminant Hydrology*, 147:34-44.

Derx, J., A.H. Farnleitner, M. Zessner, Pang, L., Schijven, J., A.P. Blaschke (2013) Evaluating the effect of temperature induced water viscosity and density fluctuations on virus and DOC removal during river bank filtration – a scenario analysis. *River Systems : Integrating landscapes, catchment perspectives, ecology, management* 20(3-4), 169-184.

Vierheilig J, Frick C, Mayer, René, Kirschner AKT, Reischer GH, Derx J, Mach. R.L., Sommer R, and Farnleitner AH. (2013) *Clostridium perfringens* is not a suitable indicator for fecal pollution from ruminant wildlife but is associated with non-herbivorous excreta and human sewage. *Applied and Environmental Microbiology*, in press

C) Fecal Source tracking along the urban waste water pathway (GEBAM)

This is an FWF funded project which started 2011 and will be run till 2015 (Group Farnleitner & ICC Water & Health). The proposed research project will focus on the occurrence of human associated and general faecal pollution indicators in communal waste water disposal as prevalent in the Austrian region. One advanced treatment plant in the Bavarian region is also included (Cooperation with Margit SCHADE und Will KOPF, Bavaria). The outcome of the investigation is going to establish the general knowledge on the quantitative occurrence,

persistence, resistance and predictability of human associated genetic fecal cells from human waste water sources. The following key issues will be addressed in detail: i) quantitative occurrence of general- and human associated in raw waste water in respect to population size, type of sewer system, and season, and ii) quantitative fate of g/h-GeBaM in comparison to standard and alternative indicators during primary and biological waste water treatment with respect to treatment type, treatment conditions and season.

Recent publications from the GEBAM project

Reischer, G.H, J.E. Ebdon, J.M. Haider, N. Schuster, W. Ahmed, J. Åström, AR. Blanch, G. Blöschl, D. Byamukama, T. Coakleyi, C. Ferguson, G. Goshu, G.P. Ko, A.M. de Roda Husman, D. Mushi, R. Poma, B. Pradhan, V. Rajal, M. Schade, R. Sommer, H. Taylor, E.M. Toth, V. Vrajmasu, S. Wuertz , R.L. Mach, and AH. Farnleitner (2013) Performance characteristics of qPCR assays targeting human- and ruminant-associated *Bacteroidetes* for microbial source tracking across sixteen countries on six continents. *Environmental Science and Technology* (in press).

Layton, B., Yiping Cao, Darcy Ebentier, Kaitlyn Hanley, Laurie C. Van De Werfhorst, Dan Wang, Tania Madi, Richard Whitman, Muruleedhara Byappanahalli, Elisenda Ballesté, Wim G. Meijer, Alexander Schriewer, Stefan Wuertz, Reagan Converse, Rachel Noble, Sangeetha Srinivasan, Joan B. Rose, Chang Soo Lee, Jiyoung Lee, Jennifer Shields, Jill Stewart, Georg H. Reischer, Andreas H. Farnleitner, Chris Sinigalliano, João Brandão, Raquel Rodrigues, Solen Lozach, Michèle Gourmelon, Lindsay Peed, Orin Shanks, Jenny Jay, Patricia A. Holden, Alexandria B. Boehm, John F. Griffith (2013) Performance of Human Fecal Anaerobe-Associated PCR-Based Assays in a Multi-Laboratory Method Evaluation Study. *Water Research* (in press)

Wang, D., Farnleitner, A.H., Field,K.G., Green, H.C. Shanks, O.C., Boehm, A.B. (in press) *Enterococcus* and *Escherichia coli* fecal source apportionment with microbial source tracking genetic markers – is it feasible? *Water Research* (in press)

Other activities

Memberships

International Water Association (IWA)

Austrian Society for Toxicology (ASTOX)

Austrian Society for Hygiene, Microbiology and Preventive Medicine (ÖGHMP)

Austrian Water and Waste Management Association (ÖWAV)

Training Courses

INTERNATIONAL POST-GRADUATE TRAINING PROGRAMME IN LIMNOLOGY 2012, Vienna

Editor activities (2)

Water Science and Technology.

Water Science and Technology: Water Supply

Awards

Andreas Farnleitner and his research team were awarded the Austrian Federal Water Award NEPTUN 2013 for cutting-edge research on alpine karst spring microbiology and the development of new methods for proactive spring quality catchment and protection.