

23 June 2021 (Wednesday)

7.00pm-8.30pm (SGT) (GMT +8)

Session 5.2 – Source Tracking

Session Chair(s): David Cunliffe, SA Health (Australia), Daisuke Sano, Tohoku University (Japan)

Current Trends In Microbial Source Tracking (MST)

A. Farnleitner. Vienna University of Technology (Austria)

Presenter is an invited speaker. No executive summary is available

Detection Of Antibiotic Resistant Opportunistic Pathogens And Resistant Genes In Domestic Wastewater And Various Surface Waters Impacted By Anthropogenic And Farming Activities.

F. Charles, L. Glass-Haller, SG. Goh, H. Chen, H. Tran, W. Li, K. Gin. National University of Singapore (Singapore)

The Singapore National Action Plan to tackle antimicrobial resistance adopts a One Health approach which encompasses the Agricultural and Food sectors, the Public Health sector as well as the Environmental sector. The main objective of this study was to assess and compare the prevalence of antimicrobial resistance (AR) determinants (antibiotic residues, antibiotic resistant opportunistic pathogens and antibiotic resistant genes) in various water compartments, such as community sewage, wastewater discharge from veterinary and animal centers, sea water from aquaculture farms and coastal beaches as well as less-impacted freshwater bodies. We identified quite significant differences between water sample types with specific AR indicators prevailing at higher abundances in domestic sewage from healthy communities and animal center than in freshwater and marine environments. *Escherichia coli* resistant to extended-spectrum cephalosporins were detected in higher concentrations in wastewater (103 and 104 CFU/100mL) than in freshwater and marine samples (below 15 CFU/100ml). The presence of carbapenem-resistant *E. coli* was detected in all water compartment.

Community-based Microbial Source Tracking of Fecal Impairment in Watersheds and Reservoirs in Singapore

S. Zhao, M. Rogers, J. He. National University of Singapore (Singapore)

The spread of disease by enteric pathogens associated with faecal contamination is a major concern for the management of urban watersheds, waterways and water distribution systems. The technical limitations of conventional microbial source tracking methods, particularly in tropical climates, which are based upon detection of faecal indicator bacteria, result in several disadvantages to their use in Singapore. In this study, faecal contamination of samples collected from local watersheds, waterways and reservoirs in Singapore have been investigated using PhyloChip and a machine-learning classification algorithm trained using a database with known faecal samples obtained locally and from overseas. Increased levels of faecal contamination in waterbodies in urban areas were correlated proximity to high density residential and intense agricultural areas as well as to weather. This integrated approach will be used to detect faecal contamination and track the types of contamination sources in watersheds in Singapore.

Quantitative Microbial Risk Assessment Of Viral Pathogens For Recreational Uses In Singapore's Reservoirs

SG. Goh, N. Saeidi, X. Gu, GG. Vergara, M. Kitajima, A. Kushmaro, K. Gin. National University of Singapore (Singapore)

In the interest of public health and safety, this study assessed the illness risks associated with the presence of four enteric viruses (norovirus, human adenovirus, rotavirus and enterovirus) for recreational water activities at 7 reservoirs in Singapore. Apart from serving as a reservoir for potable water usage, these reservoirs also serve as recreational reservoirs where various water recreational activities are carried out. A total of 231 water samples were collected throughout the two year study. Based on the occurrence data obtained, quantitative microbial risk assessment (QMRA) showed that norovirus has the highest illness risk compared to human adenovirus, rotavirus and enterovirus. Nevertheless, the mean probability of illness from norovirus was below the USEPA allowable guideline limit of 0.036 (36/1000) for secondary contact recreational water activities. Although the risk from norovirus for primary contact recreational water activities exceeded the USEPA guideline level, Singapore's reservoirs are currently not open for primary contact recreational water activities.