HEALTH-RELATED WATER MICROBIOLOGY NEWSLETTER

June 2000

Newsletter No 8

SYMPOSIUM SPECIAL

The 10th biennial Symposium of the Health-related Water Microbiology Group is upon us! And it promises to surpass anything the Group has ever done before! This Newsletter is to give members the latest development in the programme.

WITHDRAWN POSTERS

HRMP-A3: Monitoring air-water interface for detection of hazardous bacteria in surface water – Ivanov & Styabnikova

HRMP-A76: The first performance evaluation of a full-scale ozone package plant for the inactivation of *Cryptosporidium parvum* using infectivity analysis – Huffman *et al*

HRMP-B73: Impact of phosphate and monochloramine on biofilm composition studied by fluorescent *In situ* hybridisation (FISH) – Batté *et al*

CHANGES TO THE ORAL PROGRAMME

The following changes are for information only as the printed programme available at registration will include the alterations.

Session 8:	**HEALTH AND THE RECREATIONAL USE OF WATER**
1100 – 1130	HRM-22: ***Health complaints related to recreation in surface waters in the summers of 1990-1999 in the Netherlands*** EJTM Leenen & AH Havelaar (the Netherlands)
1130 – 1200	HRM-23: ***Regional features – cue factors to be considered in monitoring procedures for European bathing waters*** JA Juanes, C Álvarez, A Puente, B López & JA Revilla (Spain)

1200 – 1230	HRM-24: ***Setting bacterial water quality standards for sea bathing – a critical evaluation*** MA Mugglestone, ED Stutt & L Rushton (United Kingdom)
Session 9:	**INDICATORS OF POLLUTION**
1400 – 1430	HRM-25: ***Evaluation of the Bacteroides fragilis assay as an alternative indicator of sewage pollution*** MR McLaughlin & JB Rose (USA)
1430 – 1500	HRM-26: ***Indicators of faecal contamination of drinking water in small communities*** J Nair, R Gibbs, GE Go & K Mathew (Australia)
1500 – 1530	HRM-27: ***bacteriophage ecology in a small settlement sewer system in the northern part of Israel as related to their indicative role in sewage pollution of drinking water*** R Armon & E Marcu-Gino (Israel)

The inclusion of the fourth paper by Kay & Fleisher in Session 8 is to allow full discussion of the varying interpretations of the derivation of bathing water standards. As this has become of some interest worldwide, Dr Jamie Bartram of the WHO has agreed to chair the session.

ADDITIONAL POSTERS

(To appear as poster HRMP-A3)

Counting ranges for enumerating faecal coliforms and *E coli* grown on a chromogenic medium

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The present study determined the counting ranges for use when chromogenic media were used for enumerating faecal indicators, namely, faecal coliforms and *E. coli*. A total of 84 environmental water samples of diverse origins, such as wastewater and both polluted and unpolluted coastal marine and

inland river water, were used for establishing the counting ranges. The chromogenic medium used in the present study was CHROMagar® Liquid *E. coli*-coliform broth. The counting ranges of faecal coliforms and *E. coli* were much wider than those using the conventional culture media indicating that faecal coliform colonies could be enumerated more easily on chromogenic media even when the total number of colonies present was relatively high. Using these established counting ranges for the routine use of chromogenic media would facilitate the comparison of bacteriological water quality data obtained from different water quality laboratories.

(To appear as poster HRMP-A76)

Comparison of simultaneous total coliforms/*Escherichia coli* membrane filtration media and Colilert Quanti-Tray

J. Paulussen[1], S. Van Poucke[2], H. Nelis[2], I. Kersters[3], A. Maeyninckx[3], R. Calders[4], K. Van Hecke[5] L. Gille[6], W. Van Craenenbroeck[1]
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The 98/83/EG directive stipulates the microbiological methods to control drinking water for example for the presence of total coliforms and *E. coli* instead of thermotolerant coliforms. This item was the basis for a comparison of a battery of media which detect coliforms and *E. coli* simultaneously. The different media were used as daily routine procedures on different waters. Culture media for the simultaneous detection of TC and *E. coli* compared included Chromocult, ColiID, mColiBlue, CEC and Colilert Quanti-Tray. As a sixth medium Colicult, a medium developed by SVW/UG that detects TC and *E. coli* already after 12.5 hours, was included. Unlike the other culture media tested, Colicult does not contain any enzyme substrates but is used in a two-step procedure in which the latter are added in a second step following the propagation of the target colonies during 12 hours. Tergitol 7 and mFC were used as reference media for TC and *E. coli*, respectively. The data were obtained on drinking (n=450) and well waters (n=95). Special attention was paid at the confirmation of both typical and atypical colonies on all media compared. Results were expressed in terms of overall agreement, sensitivity, specificity, false positive error and undetected target error. The total material cost was likewise calculated. All enzymatic media were found to be very specific for *E. coli* and were in good agreement with the reference media. In contrast, for total coliforms, not all media were as specific as indicated in the commercial documentation. CEC and ColiID are very sensitive to *Aeromonas* sp. and scored worse. Colicult and mColiBlue showed some underestimation, but still agreed sufficiently with the reference methods. The figures obtained for Colicult are remarkable in view of the total detection time of 12.5 hours. Colilert Quanti-Tray was found to be very specific but detected lower numbers then the reference media. Chromocult enriched with cefsulodin showed results which are comparable with the standard media and is above all the least expensive.

(To appear as poster HRMP-A96)

Healthy beaches Tampa Bay

JB Rose[1]*, VJ Hardwood[1], M McLaughlin[1], HS Greening[2], S Farrah[3], M Tamplin[3], G Lukasik[3], M Flanery[4] & P Stanek[4]
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Recreational waterborne disease can result from water contamination from numerous sources, including human and animal wastes, urban runoff, industrial pollution, wastewater, storm waters, large concentration of bathers and even from indigenous sources such as red tide. Public health and safety are tied to the understanding of sources of pollution so that (a) prevention and remediation can be accomplished and (b) timely (preferably advance) public information can be made available. Clean beaches, and the recreational activities associated with them, form the backbone of the tourist industry in Florida; however, most of Florida may be classified as a tropical water. There are significant concerns the water quality indicators in general use do not faithfully reflect pollution or indicate what level should result in beach closure. The limitations of total and faecal coliforms in recreational waters (particularly subtropical waters) are now well recognized. Other indicators, such as Enterococcus, Clostridium perfringens and bacteriophages, have been suggested but each appears to have its own limitation when relied upon to indicate the presence of human pathogens such as enteric viruses. A multi-pronged approach is required perhaps with a suite of indicators coupled with pathogen monitoring. The goals of this program were to establish criteria, protocols and monitoring plans for integrated management strategies to be used for assessment and response to public health concerns for subtropical beaches in Florida and the US. Using a scientific-based risk-assessment approach, land use, sources, climate factors and broad water quality monitoring can be used to address appropriate management strategies in the future. Twenty-two sites have been monitored for one year in Tampa Bay, representing ten watersheds with varying agricultural and urban inputs as well as four beach sites, for human viruses and alternative indicators. Molecular source tracking was also used to distinguish human from animal inputs. Beach contamination was related to urbanisation and rainfall. High levels of faecal coliforms and enterococci were seen (40% above standards and as high as 100,000 CFU/100mL). However, coliphage and Clostridium were found in areas primarily impacted by human development. One key watershed was shown to have significant human virus contamination as well as significant levels of human indicator bacteria based on molecular fingerprinting. These data are being used to examine stormwater management strategies and land use impacts on water quality.

(To appear as poster HRMP-B73)

Development and Field Applicability of a 3.5-Hour ChemScanRDI *E. coli* test

S. Van Poucke[1], L. Gille[2], H. Nelis[3] & W. Van Craenenbroeck[4]
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Reducing the time needed for bacteriological testing to less than one working day is considered as a major step in the development of rapid testing methods. However, in cases where major accidents or pollutions in distribution systems occur, even more rapid methods are needed to evaluate the situation quickly and to allow release of the water as soon as possible. This joint research project between SVW, UG and Chemunex was set up to develop a test for *E. coli* which should take maximally 4 hours. This could only be achieved by making use of instrumental detection techniques that detect the target organisms at the single cell level and are independent from bacterial growth and multiplication. The ChemScanRDI, a laser scanning detection device making part of a technique called solid phase cytometry, meets this criteria. It allows the scanning of an entire 25-mm membrane filter surface and the processing of data hence acquired within less than 3 min. Following laser scanning, the nature and morphology of each detected event can be verified online by the aid of an automated epifluorescence microscope attached to and driven by the ChemScanRDI. The instrument requires the target organisms to be fluorescently labelled. This was achieved by using -glucuronidase as a marker enzyme which is demonstrated in a 30-min labelling step that follows a 3-hour selective induction phase. Hence the total test time is limited to 3.5 h. A validation study performed to (1) define the real test time in a routine situation; and (2) define the field of application of the test, taking into account the limitations due to the physico-chemical quality of the waters tested on one hand and the acceptation of the test to replace the existing testing methods on the other, was set up. To this end, 1048 water samples from works in the distribution network, drinking waters, waters from the different stages of the production process and well waters were analyzed. The latter two were chosen mainly to obtain a reasonable number of *E. coli* contaminated samples. The test's performance was compared with standard tergitol-7 agar. Besides, Chromocult was used as a reference plate method based on the same detection principle as the ChemScanRDI *E. coli* test. On a daily routine basis, 21 samples could easily be analyzed in triple (ChemScanRDI and reference tests). It was demonstrated that up to 50 samples can be processed on the ChemScanRDI within a work shift of 8 hours if incubations were launched at its start. More than 96% of all drinking waters and waters from works (n=784) were analyzable on the ChemScanRDI. The remainder were either not filterable through the 25-mm membrane filters (n=1) or contained too much fluorescence information to be processed by the instrument (n=29). The overall agreement was 95% versus tergitol-7 and 96% against Chromocult. In 20 samples out of 1006, *E. coli* was detected by the ChemScanRDI but not by the reference methods. No

statistically significant different counts between the ChemScanRDI test and reference tests were obtained. The ChemScanRDI *E. coli* test was found to be a good method for screening purposes on drinking water and waters from works.

NOTICES AT THE SYMPOSIUM

A notice board will be maintained at the Symposium to alert delegates to any last minute changes – please keep an eye on it!

Also on this board will be the list of poster titles for each session to allow delegates to check that they are where they are supposed to be!

See you all in Paris!

Please note that all correspondence for the Newsletter should be sent to HRWMNews@microbe.demon.co.uk

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