

WHO's Review of HPC in Drinking Water Quality and Health

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WHO/NSF Collaborating Centre

NSF Center for Pub.Health Ed.

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Issues

- Health Risk to General Public?
- Pathogen Index?
- Process Performance Indicator?
- Aesthetics?

Process

3 Day Symposium

2 Day Expert Meeting

WHO Report

Symposium:
34 Papers, 14 Posters,
180 attendees
34 Sponsors
inc. Aqua Europa, WQA,
EBWA,
IBWA, GISENEC-UNESEM

Expert Committee:

30 selected members and
Observers

10 Countries

Sponsors-USCDC, USEPA,
AWWARF, Health Canada

Coverage

- Public Drinking Water Systems
- Treatment Devices
- Bottled Water
- Ice Machines
- Storage Tanks
- Health Care Facilities

Heterotrophs

- Bacteria, Yeasts, Molds
- Biofilms-related frequently
- Require Organic Carbon for Growth
- No Disinfectant Residual

HPC Measurement

- Very Broad /Non Specific Measurement
- Many Test Variations; Time, Temp., Media
- Undefined Composition
- Small Portion of Incident Organisms
- Mostly Natural non-Hazardous Biota
- Some *could* be pollutant related

History of Use

- Robert Koch-1880's
- Effectiveness of Filtration/Disinfection
- Numbers of Regrowth Organisms-with/without Sanitary Significance?
- Nutrient Availability
- No Disinfectant Residual
- Interference with Coliform Measurement with Lactose-based Culture Media-Sec. Std.

Infective Doses of Some Heterotrophs-estimates

- *Acinetobacter* 10(+6,+8) mouse
- *Aeromonas hydrophila* 10(+7,+8) human
- *Mycobacterium avium* 10(+8) mouse
- *Pseudomonas aruginosa* 10(+10) human

- *No epi evidence of GI infection associated with water in general population

HPC Consumption from Food

- Cabbage $10(+9)$ per gram billions
- Celery $10(+9)$ per gram billions
- Lettuce $10(+7)$ per gram millions
- Milk $10(+9)$ per gram billions
- Orange juice $10(+4)$ per gram thousands
- Cheese $10(+7)$ per gram millions
- Prunes $10(+2)$ per gram hundreds
- from Gerba/Stine/Chaidez/Pepper

Tap Water/Bottled Water

- <1 to 10,000+ per ml.
- <1% of total intake

Detected by HPC test e.g.

Pseudomonas aruginosa

Acenitobacter

Aeromonas

Klebsiella pneumoniae

others

No evidence of waterborne GI infection in
general population

Not Detected by HPC Test (examples)

- Legionella
- Non-tuberculous Mycobacterium avium

- No correlations between these or other bacteria and HPC detection/quantitation

Plumbed-in Devices

- Water Softeners, Carbon Filters, RO Devices
- Activated Alumina, Particle Filters
- Water Vending, Ice Machine, Taps

- HPC does not indicate health risk if entry water is biologically safe
- Aesthetic maintenance per Manu. Recom.

Bottled Water

Regrowth-time, temp

Water Safety Plans

Pseudomonas aruginosa and HPC
use for process mgt. not as health risk
indicators

WHO Conclusions

- HPC levels increase from regrowth when disinfectant residual is removed
- Favored Conditions: Time, Temp., Nutrient
- Increased HPC does not indicate health risk if entry water meets microbial standards
- Appropriate maintenance per manufacturers recommendations

High risk populations, urinary catheters
etc.

Usually not water borne infections

Some water implications

Typical DW not always suitable

Immunosuppressed (eg neutrophil
<500/ul) may require special water

Health Care Facilities

Bacteri contamination, in general

Infection control plans

Water safety plans

Shower heads, medical devices, dialysis
units, dental water dispensing

Not a good pathogen index

Generally useful as water treatment
performance indicator

May be useful to indicate aesthetic
effects potential

Participants

Convenor: Bartram

Chair: Exner

Rapporteurs: Cotruvo, Glasmacher

Members: Ashbolt, Bonnadonna, Cunliffe, Dufour, Edberg

Endo, Fricker, Gerba, Hunter, LeChevallier,
LeClerc, Lightfoot, Magara, Mossel, Payment,
Reasoner, Robertson, Sartory, van der Kooij

Observers: Allen, DeWet, Moreau, Olivier, Schubert, Stevens,
Struyk

Full Report

who.int/water_sanitation_health/watonline8

hotlinks:

www.WQA.org

AWWARF.com/whatsnew

NSF.org/search/search.asp