



Microbial challenges – contamination and aftergrowth

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A photograph of two workers in high-visibility safety gear. One worker in a yellow suit and helmet is operating a high-pressure water sprayer, creating a large mist of water. The other worker in an orange and black suit and helmet stands nearby, smiling. They are outdoors, with green foliage and a grey wall in the background.

The 10th Nordic

DRINKING WATER CONFERENCE

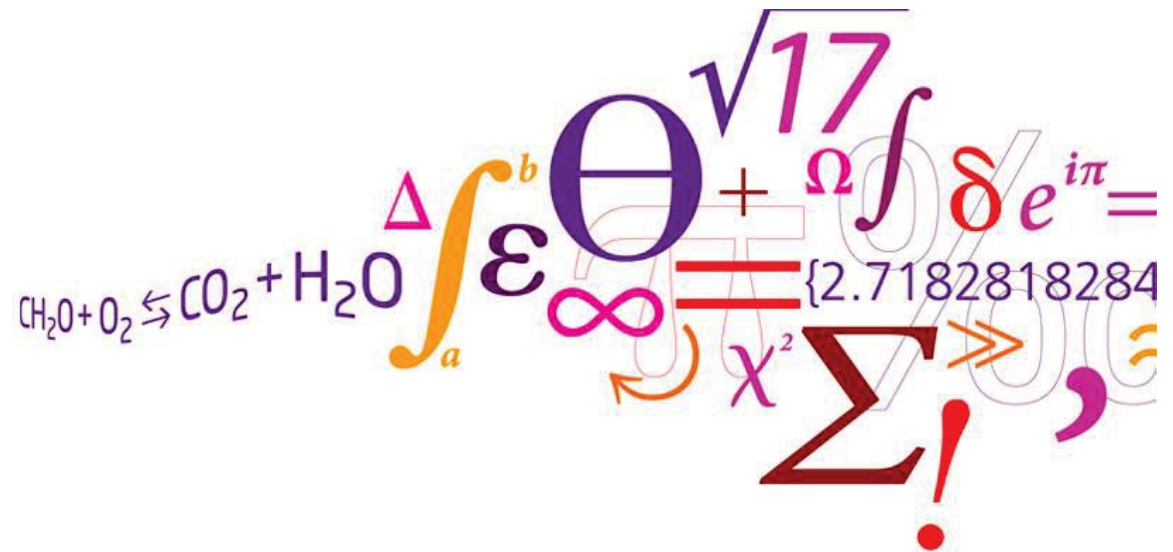
Reykjavík, September 28–30 2016

PROGRAM

Workshop 4
 Cooperation in research and development
 in the Nordic countries

Microbial challenges – contamination and aftergrowth

Hans-Jørgen Albrechtsen



The 10th Nordic
 DRINKING WATER CONFERENCE
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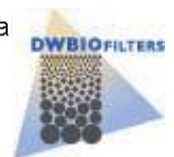
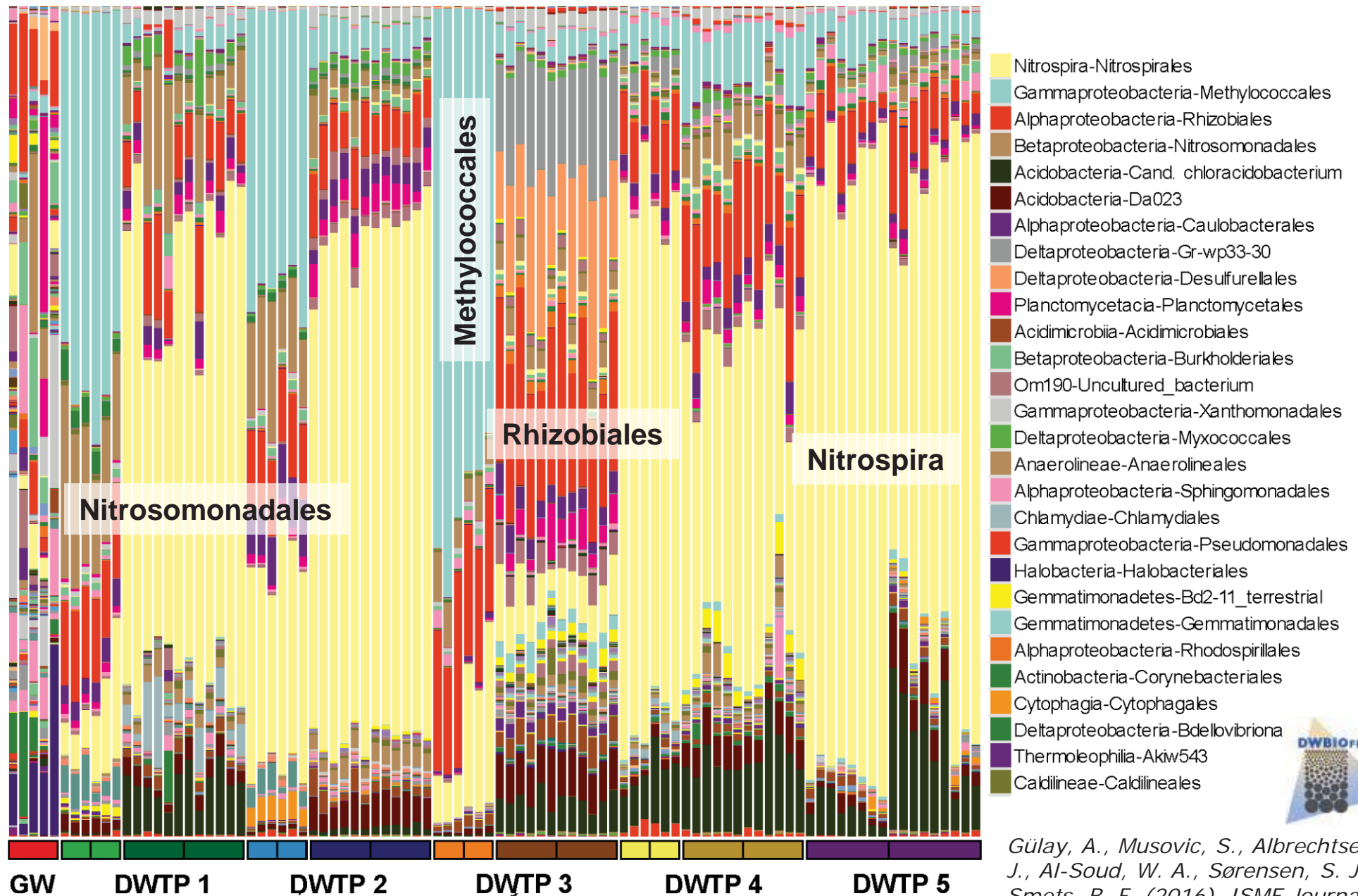
DTU Environment
 Department of Environmental Engineering

Cooperation in research and development in the Nordic countries

- Search for common problems / challenges
- Topics at this conference
 - Measuring methods
 - Risk assessments / water safety plans
 - Lack of compliance in microbial quality at small water works
 - Biofilm
 - Disinfection
- Rapid development in microbial methods
 - Virus
 - Genomics – full genome sequencing
- Important input to risk assessment – QMRA
- Microorganisms dominant risk in water supply

Microbial communities

Filter material - Pyrosequencing



Køge 2007

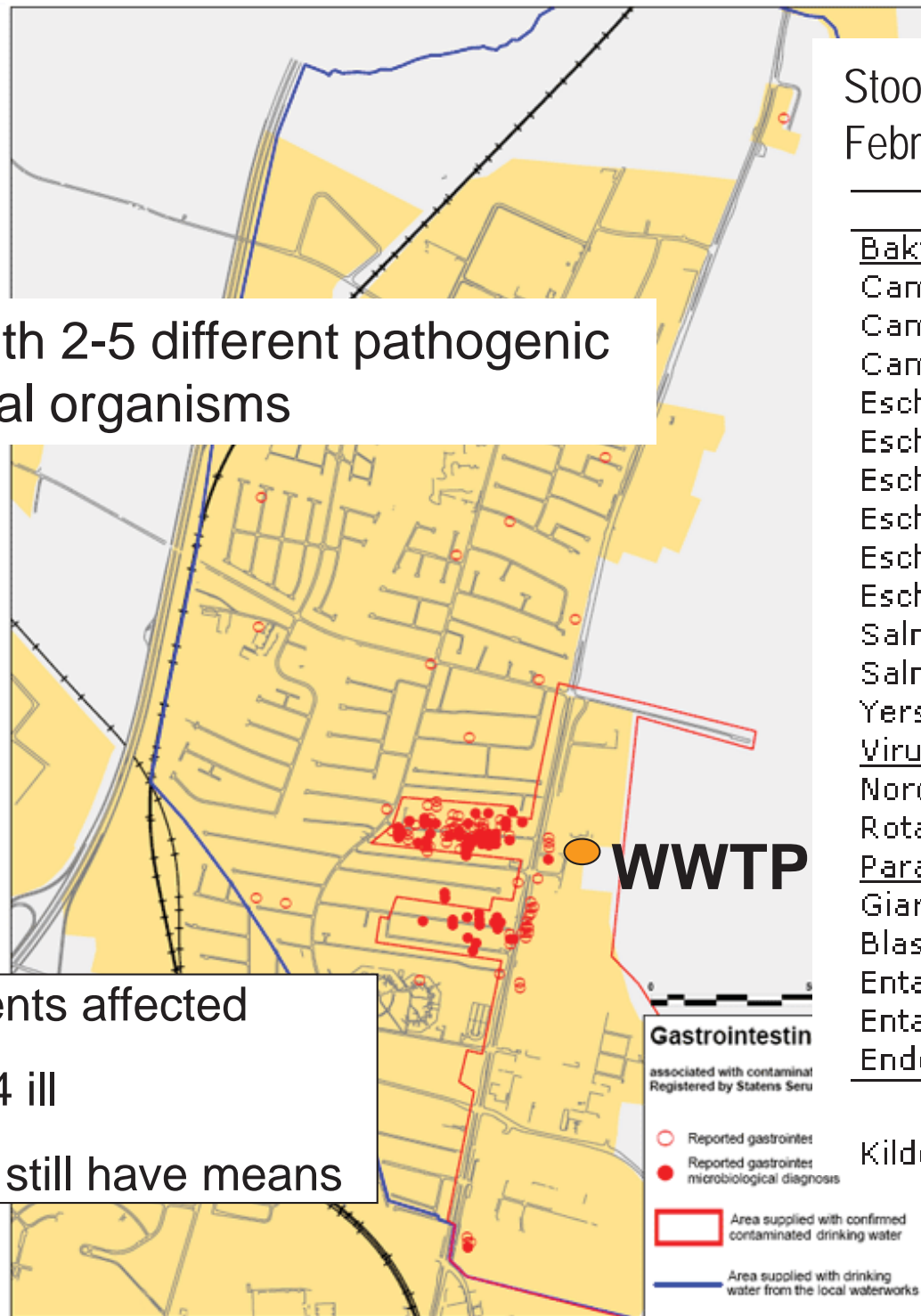
Stool samples from patients, end of February 2007

Bakterie	N
Campylobacter jejuni	16
Campylobacter coli	4
Campylobacter lari	3
Escherichia coli (A/EEC)	15
Escherichia coli (EPEC O55)	1
Escherichia coli (EPEC O119)	3
Escherichia coli (EPEC O128)	1
Escherichia coli (ETEC LT)	1
Escherichia coli (VTEC VT1+VT2)	1
Salmonella Stanley	2
Salmonella Senftenberg	1
Yersinia enterocolitica	1
<u>Virus</u>	
Norovirus	32
Rotavirus	3
<u>Parasit</u>	
Giardia intestinalis	4
Blastocystis hominis	12
Entamoeba histolytica/dispar	1
Entamoeba coli	6
Endolimax nana	2

23 patients with 2-5 different pathogenic gastrointestinal organisms

15. Jan. 2007

- 3. april 2007



7,000 citizens affected

At least 224 ill

Approx. 40 still have means

Kilde: EPI-NYT uge 10, 2007

Biofilm samples – hot water



Galvanized steel

Diam: 16 mm

28 days

Hot water tank

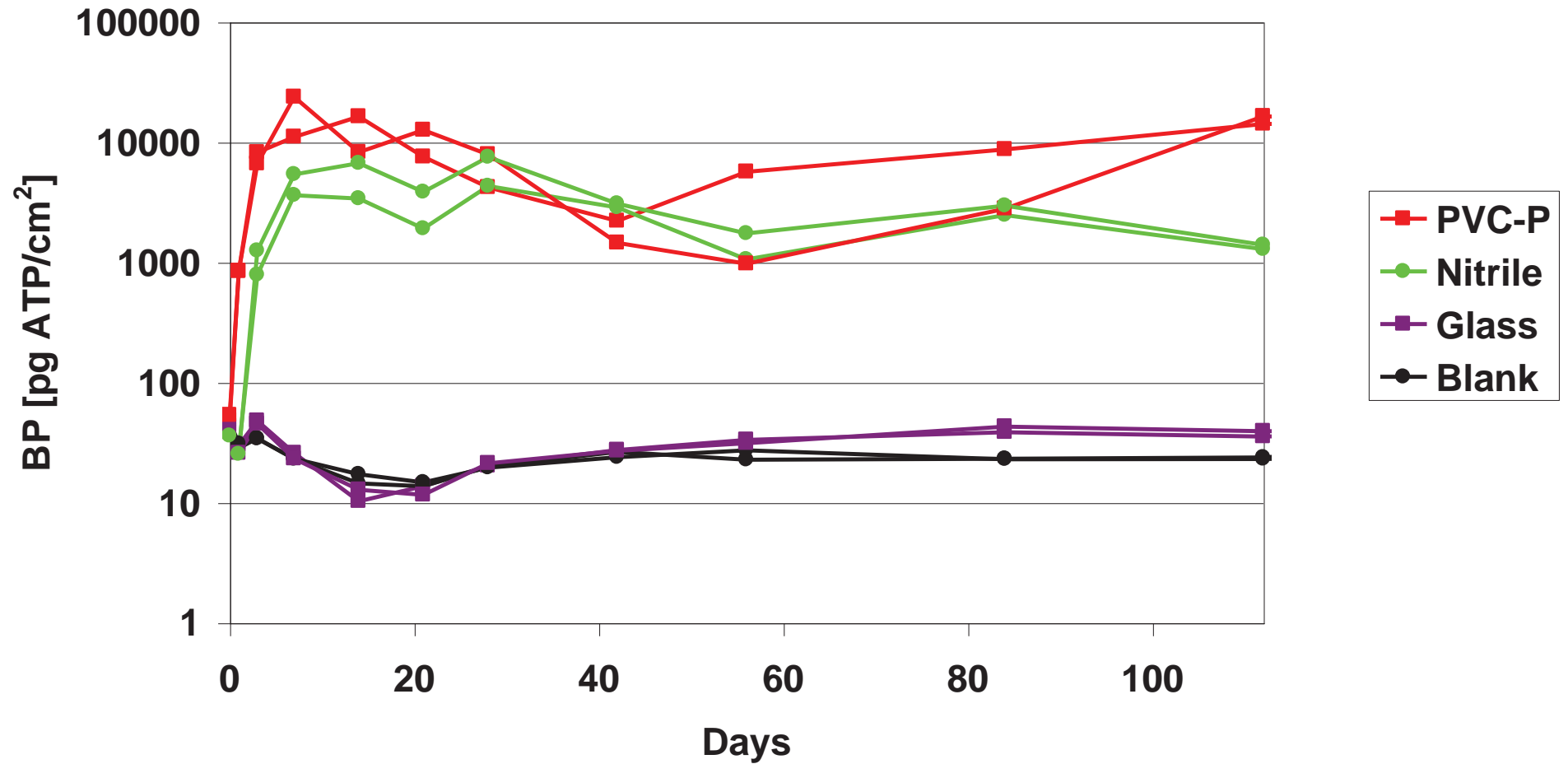
L.K. Bagh et al., 1999, Biofouling 14 p. 37-47

Microbial growth at materials in water supply

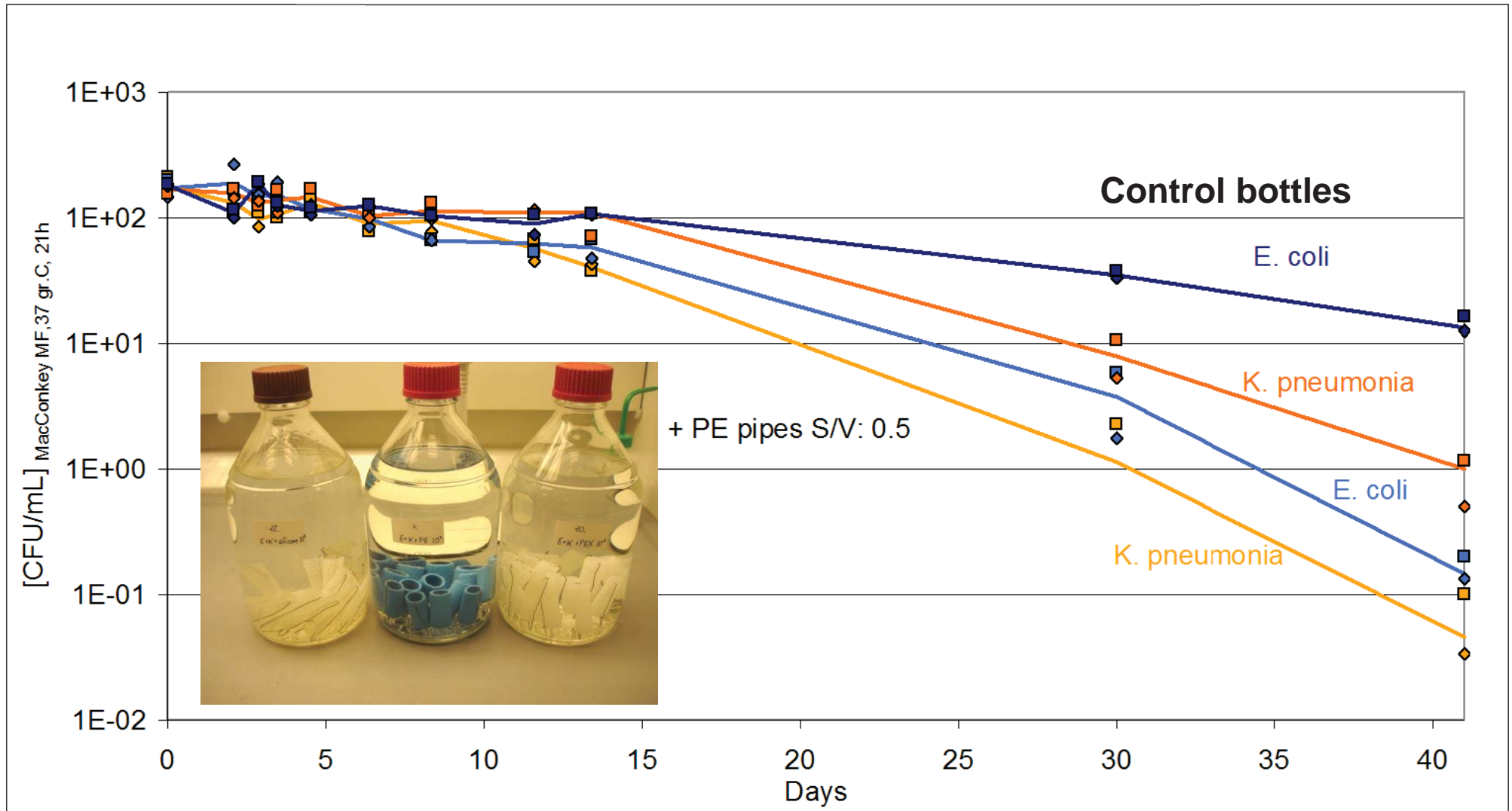


Development over time

25° C, S/V ~ 0.17 cm⁻¹, water exchange 1 x /week



K. pneumoniae, *E. coli* (ATCC 25922) survival in contact with plast pipes



Topic's

- Aftergrowth in the network
 - Interaction with materials (PE, rubber...)
 - Formation of biofilm
- Emerging pathogens?
- Survival and behavior of pathogens or indicators in the distribution network
 - Interaction with biofilm
 - Interaction with sediment in the distribution system