Research report

Assessment of the microbiological efficacy of ToBeSure® water

Principle

The Mistral water dispensers under investigation are fitted with UV disinfection modules (ToBeSure® (TBS) system), which, through their physical action, eliminate any bacterial flora that may be present in the mains water supply.

Study description

The study involves circulating water deliberately contaminated with Pseudomonas aeruginosa in order to measure the reduction in microbial load at the outlet, at two flow rates (2 L/min and 3 L/min) and for modules with different operating histories (0 hours, 500 hours and 1.000 hours).

Procedure

The analyses are carried out on 7 UV systems:

- X, Y, Z with 0 hours of operation,
- T, U with approximately 500 hours of operation,
- R, S with approximately 1.000 hours of operation.

Préparation des solutions mères

The bacterial strains are freeze-dried and stored in a freezer at temperatures between -86°C and -70°C.
They are rehydrated at room temperature for 30 minutes.
The spiked solutions are then prepared to achieve target concentrations of: 1.5×10^6 CFU/100 mL.

The solutions obtained with measured concentrations were:

- P. Aeruginosa 1,215×10^6 UFC/100 mL (log10 = 6,08).

Sampling protocol:

Samples are taken in sterile, single-use 500-ml bottles.
Three samples are taken:

- 1 sample for calibration from each tank
- 1 sample at 2 litres/minute
- 1 sample at 3 litres/minute

Between each test, the circuit is flushed and disinfected to prevent any cross-contamination.

Test No. 1: Assessment of bacterial reduction using TBS LED devices

Analytical standards:

BACTERIA	Relevant standards
Pseudomonas aeruginosa	Standard NF EN ISO 16266 August 2008

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Standardised strains used and culture media (Oxoid):

Calibrated strains used	Culture media (Oxoid):
Pseudomonas aeruginosa ATCC 9027	Cetrimide

Results :

Flow rate 2L/ min

Bacterial reduction - UFC/100ml	Calibration 2L/min	TBS R 1000h	TBS S 1000h	TBS T 500h	TBS U 500h	TBS X 0h	TBS Y 0h	TBS Z 0h	DATE
PSEUDOMONAS AERUGINOSA NF EN 16266/ germs per 100ml	1 215 000	0	0	0	0	0	0	0	déc-25

Bacterial reduction - Reduction log10	Calibration 2L/min	TBS R 1000h	TBS S 1000h	TBS T 500h	TBS U 500h	TBS X 0h	TBS Y 0h	TBS Z 0h	DATE
PSEUDOMONAS AERUGINOSA NF EN 16266/ germs per 100ml	1 215 000	>6,08	>6,08	>6,08	>6,08	>6,08	>6,08	>6,08	déc-25

*average of the results

Flow rate 3L/ min

Bacterial reduction - UFC/100ml	Calibration 3L/min	TBS R 1000h	TBS S 1000h	TBS T 500h	TBS U 500h	TBS X 0h	TBS Y 0h	TBS Z 0h	DATE
PSEUDOMONAS AERUGINOSA NF EN 16266/ germes per 100ml	1 215 000	0	0	0	0	0	0	0	déc-25

Bacterial reduction - Reduction log10	Calibration 3L/min	TBS R 1000h	TBS S 1000h	TBS T 500h	TBS U 500h	TBS X 0h	TBS Y 0h	TBS Z 0h	DATE
PSEUDOMONAS AERUGINOSA NF EN 16266/ germs per 100ml	1 215 000	>6,08	>6,08	>6,08	>6,08	>6,08	>6,08	>6,08	déc-25

*average of the results

→CONCLUSION :

The tests indicate that the TBS5.0 UV modules provide highly effective microbiological disinfection under the conditions tested. P. aeruginosa is completely eliminated (≥ 6 log) at both flow rates.

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