Malka Halpern et al., J Microb Biochem Technol 2016, 8:2(Suppl)
http://dx.doi.org/10.4172/1948-5948.C1.016

Legionella ecology in drinking water distribution

Malka Halpern[1], Yehonatan Sharaby[1], Sarah Rodriguez-Martinez[1], Marina Pecellın[2], Ingrid Brettar[2] and **Manfred Hofle[2]**
[1]University of Haifa, Israel
[2]Helmholtz Centre for Infection Research, Germany

Bacteria of the genus *Legionella* cause water-based infections resulting in severe pneumonia. Our aim was to improve our knowledge regarding *Legionella* ecology in drinking water systems in Israel. Seasonal samples were taken from water and biofilm at seven sampling points of a small drinking water distribution system. *Legionella pneumophila* (*Lp*) was isolated and identified to its genotype level. High resolution genotyping of Lp isolates was achieved by multiple-locus variable number of tandem repeat analysis (MLVA). within the studied water system, *Legionella* plate counts were significantly higher in summer. *Legionella* was isolated from six out of the seven selected sampling points with counts up to $5.8*10^3$ cfu/l. Lp counts were negatively correlated with chlorine. Five Lp MLVA-genotypes (Gt4, GT6, GT15, GT17 and GT48) were identified at different buildings along the water system route. The presence of a specific genotype, GT4, consistently co-occurred with high *Legionella* counts and seemed to "trigger" high *Legionella* counts in cold water. In laboratory experiments GT4 isolates exhibited superior growth abilities at 37-42 °C with shorter lag-phase (λ), higher growth rates (μm) and maximal cell densities (A), compared to 25-30 °C and also compared to genotypes GT6 and GT15 at the same temperatures. GT4 strains were observed as causative agents of Legionnaire's disease. Our hypothesis is that the presence of specific genotypes may indicate high *Legionella* concentration in water and that adaptation for growth at human body temperatures may assist some *Lp* strains to successfully infect and proliferate within the human body, thus facilitating their ability to cause illness.

Biography

Malka Halpern is an Environmental Microbiologist at the University of Haifa. She has completed her PhD from Haifa University, Israel and her Postdoctoral studies from Tel-Aviv University, Israel. Her main interests are the ecology of waterborne pathogens and in particular *Vibrio cholerae, Aeromonas* and *Legionella*, plant-bacteria interactions and bacterial taxonomy. She has published more than 49 papers in reputed journals.

mhalpern@research.haifa.ac.il

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