Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

22 al 25 de octubre del 2024
Centro cultural y Pabellón Argentina de la Universidad Nacional de Córdoba, Córdoba, ARGENTINA.

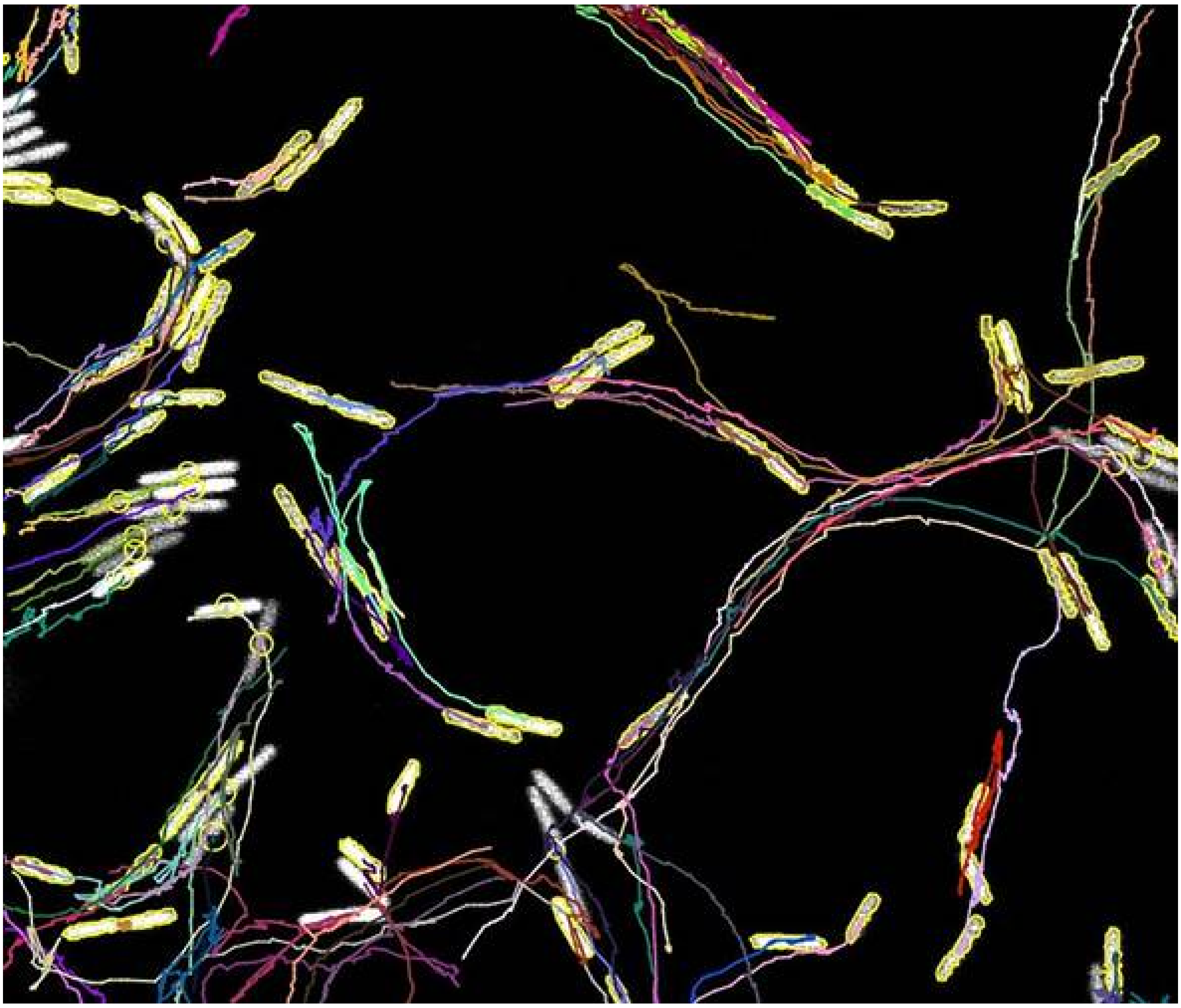

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

MICROBIAL COMMUNITIES IN WATER STORAGE TANKS AND POINT-OF USE TAPS DURING LOW WATER CONSUMPTION IN A FULL-SCALE DRINKING WATER DISTRIBUTION SYSTEM

Corimayo, Sheila Nahir [1]* - Aparicio Gonzalez, Mónica[1] - Cheng, Dan[2] - Cai, Jiawei[2]- Nasha, Nadhirah[2] - Wuertz, Stefan[2,3] - Rajal, Verónica Beatriz[1,2,4] - Cruz, Mercedes Cecilia[1]

1) INIQUI, UNSa - CONICET - Salta - Argentina
2) Singapore Centre for Environmental Life Sciences Engineering, Nanyang Technological University - Singapore
3) School of Civil and Environmental Engineering, Nanyang Technological University - Singapore
4) Facultad de Ingeniería, UNSa - Salta - Argentina
Contacto: SHEICORIMAYO.96@GMAIL.COM

Several factors are known to influence changes in biological stability of drinking water from storage tanks to point-of-use taps, including pipe material, decay of disinfectant residuals, stagnation, and changes in water temperature. Temperature is considered a key variable for biofilm growth rates and, consequently, may impact bulk water quality. Further, prolonged stagnation in pipeline networks can lead to bacterial regrowth, potentially decreasing water quality. Additionally, different portions of the water system, such as storage tanks and taps at the end of premise plumbing, can be affected differently across the drinking water distribution system (DWDS). Few studies have examined the effects of stagnation on microbial communities at different temperatures in a full-scale DWDS. Here, we studied the effects of seasonal temperature variations combined with low water consumption, on bulk water microbial communities in different portions (tank and point-of use taps) of a full-scale DWDS with sodium hypochlorite as secondary disinfectant. Fifty-six bulk water samples were collected monthly from five taps in different buildings and from two storage tanks located on a university campus in Salta, Argentina over eight months: April to May (medium temp), June to August 2020 (low temp), and November to January 2021 (high temp), during periods of low water consumption. The bulk water bacterial community profile was characterized by Illumina MiSeq sequencing of the V4 hypervariable region of the 16S rRNA gene. The alpha-diversity, 2D (inverse of Simpson index), was higher in tank samples than in tap waters at low (2D=27 and 15, respectively, p-value = 0.02) and medium temperature (2D=23 and 13, respectively, p-value = 0.02). However, at high temperature there were no significant differences in the alpha-diversity between both portions (2D=21 and 16, for tank and tap water, respectively, p-value = 0.18). The microbial composition differed significantly in bulk water samples from taps and tanks at all temperature levels (p-value was 1x10-4 for low, 8x10-4 for medium and 0.01 for high temp) based on the Bray Curtis dissimilarity index. Based on their relative abundance, *Sphingomonas* (9.7%), *Qipengyunia* (6.6%), and *Paracoccus* (5.3%) were more predominant in tank samples, while *Mycobacterium* (7.4%), *Sphingomonas* (5.6%), and *Nevskia* (5.5%) were more abundant in tap samples for the three temperature levels studied. Interestingly, the microbial composition at each sampling site remained consistent across the three temperature ranges with no significant change observed (p-value = 0.5-0.9). In this work we found that microbial diversity and composition differed in storage tanks and point-of-use taps. Temperature did not drive bacterial communities within different portions of the water system during periods of low water consumption. Further studies are required to elucidate the health risks associated with different microbial communities present across DWDS.

Palabras clave: Drinking water – Low water consumption – Temperature
variation - Microbial communities – Storage tanks