

TITLE: ANTIBIOFILM ACTIVITY OF WATER AT HIGH TEMPERATURE: IS ITS USAGE POSSIBLE IN DENTAL UNIT?

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ABSTRACT:

Dental unit waterlines can allow the biofilm formation and, consequently, dispersion of this microbial contamination in water intended for dental treatment. The objective of this study was to evaluate *in vitro* water antibiofilm activity at high temperature against *Pseudomonas aeruginosa*. *P. aeruginosa* biofilm (ATCC 27853) was formed in fragments of waterline (FW) of 1cm (n=48). The incubation was carried out in an incubator shaker at 37°C for 24h at 80rpm. After the incubation period elapsed, the FW were flushed with saline solution at 0.85% for removing planktonic cells. Experimental groups with different temperatures and exposition times were evaluated: room temperature (control) – (n=24) and at 60°C (n=24), and 30s (n=12) and 60s (n=12). The numbers of colony-forming units expressed per FW (CFU/FW) were determined after seeding in Petri dishes (60x15mm) with *Cetrimide Agar* and incubation in chamber at 37°C for 24h. Furthermore, the FW samples were fixed, dehydrated, metalized and submitted to analysis through scanning electron microscopy (SEM). The data collected were submitted to statistical analysis using Shapiro–Wilk and Mann–Whitney *U* tests through BioEstat® (version 5.3) software and $\alpha=5\%$ significance level. There was a difference between the comparison of medians of bacterial loads exposed to water at room temperature (335,000CFU/FW) and at 60°C (2,030CFU/FW) for 30s ($p=0.0005$). Moreover, the comparison between the medians of bacterial loads exposed to water at room temperature (173,000CFU/FW) and at 60°C (1,780CFU/FW) for 60s showed difference ($p=0.0047$). The SEM demonstrated biofilm presence on all analyzed samples, but on FW exposed to water at 60°C, the rods were evidenced in less quantity and with atypical morphological characteristics. In conclusion, the exposition of *P. aeruginosa* biofilm formed in dental unit FW to water at high temperature reduced the load and changed the bacterial morphology, demonstrating a possible applicability in biosafety: contamination/infection control in dentistry.

Keywords: biofilms, contamination control, disinfection, dental unit waterline, water microbiology high temperature.

Development Agency: nothing to declare.