

EVALUATION OF IN-OFFICE DENTAL UNIT WATERLINE TESTING

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Background/Objectives: The CDC recommends monitoring of heterotrophic bacteria in dental unit waterlines (DUWs), and has established guidelines similar to potable water [<500 Colony Forming Units (CFUs)/ml] for non-surgical dental procedures. In-office DUW testing systems have become commercially available for monitoring DUW bacteria. This study compared commercially available in-office DUW testing systems: Aquasafe (Pall Medical, Ann Arbor, MI), Petrifilm (3M, St. Paul, MN), and Heterotrophic Plate Count Sampler (HPC) (Millipore, Burlington, MA) with R2A laboratory plating methodology.

Methods: After a 3 minute flush of the DUW, a 40 ml water sample was collected from the air-water syringe from 20 dental units located in two clinics. Manufacturers' directions were followed for in-office test systems. Sample volumes and incubation conditions were: Aquasafe – 1 ml incubated at room temperature for 72 hrs, Petrifilm – 1 ml incubated at 35°C for 24 hrs in a humid environment, and HPC – 18 ml with the addition of sodium thiosulfate incubated at room temperature for 72 hrs. R2A – 0.1 ml with the addition of sodium thiosulfate was plated in duplicate by spread-plate method on R2A agar and incubated at 35°C for 7 days. Sodium thiosulfate was added to neutralize residual chlorine. Sterile water was used as a negative control for all methods. Heterotrophic bacterial counts of greater or less than 500 CFUs/ml were endpoint criteria for assessing the effectiveness of in-office monitoring systems as compared to R2A plating methodology. Results were compared using concordance and kappa statistic.

Results: Concordance and kappa (κ) values for agreement of each method with R2A were: Aquasafe 45% ($\kappa=0.14$), Petrifilm 70% ($\kappa=0.44$), and HPC 65% ($\kappa=0.38$).

Conclusions: In-office testing of DUWs with Aquasafe, Petrifilm, or HPC poorly agreed with the gold standard (R2A) and as such should be discouraged as means of accurately monitoring bacterial density in DUWs.