P23: Drinking water quality and potential risks related to the presence of biofilms in water taps of Portuguese Schools

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Introduction: In drinking water distribution systems the surfaces of taps are in contact with non-sterile water, which can lead to biofilm development. Biofilms can harbor opportunistic pathogens, representing a potential risk factor of water-related diseases, especially to sensitive human subgroups such as children.

Objectives: This study aimed to assess the microbial quality of water and the biofilm presence on inner surfaces of taps and flow straighteners.

Materials and Methods: Nine schools were studied in the following sampling points: taps of bathrooms and canteens and water fountains located in playgrounds, in a total of thirty-three inner tap surfaces and twenty-two flow straighteners. Aerobic plate counts (APC) at 22ºC and 37ºC, total coliforms, *E.coli*, *Clostridium perfringens*, *Pseudomonas aeruginosa* and coagulase-positive *Staphylococcus* were analyzed. Additionally, free chlorine concentration, pH and temperature were also determined in thirty-six drinking water samples.

Results and Discussion: Overall, the water samples complied with legal physical and chemical requirements, however some of them do not respect the microbiological recommendations for drinking water (Decree-Law No. 306/2007) regarding to APC at 22ºC and 37ºC (30.6% and 19.4%, respectively). Over than 60% of the inner surfaces of taps and flow straighteners showed high counts of APC at 22ºC (from $5x10^1$ to $6x10^6$ CFU/unit sample) and 37ºC (from $4.5x10^1$ to $6.2x10^6$ CFU/unit sample). In flow straighteners pathogenic microorganisms, such as coliforms, *Clostridium perfringens, E. coli*, *Pseudomonas aeruginosa* and coagulase-positive *Staphylococcus* were also detected.

Conclusion: The results confirm the presence of biofilms in the inner surfaces of some taps and flow straighteners, suggesting deficiencies in the integrity of water distribution systems of some schools. Future research should focus on tap materials characterization and other factors that may influence biofilm development.

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References

1. Decree-Law No. 306/2007, August 27th. Diário da República n.º164 – I Série. Ministério do Ambiente. Lisboa.