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P-104 - INTER-KINGDOM BIOFILM FORMATION BETWEEN BACTERIA AND FILAMENTOUS FUNGI ISOLATED FROM A DRINKING WATER DISTRIBUTION SYSTEM

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Background

The main challenge to the drinking water (DW) industry is to deliver a product that is microbiologically and chemically safe, aesthetically pleasing and adequate in quantity and delivery pressure. Biofilms constitute one of the major microbial problems in DW distribution systems (DWDS) that most contribute to the deterioration of water quality. Knowledge on DW biofilms has been mainly obtained from studies on bacterial biofilms even though, under natural conditions, they are usually viewed as complex communities where different organisms are present, including filamentous fungi (ff). Studies regarding ff biofilms are scarce despite their ability to form complex and multicellular biofilms [1, 2]. Diversity in microbial communities leads to a variety of complex relationships involving interspecies and intraspecies interactions that need to be understood. The aim of this study was to assess the dynamics of inter-kingdom biofilm formation between commonly detected ff and bacteria in DWDS.

Method

The ff *Penicillium expansum* and the bacteria *Acinetobacter calcoaceticus* and *Methylobacterium oryzae* [3] were used as model species. Biofilm formation was performed using microtiter plates with rotatory movements mimicking water flow behaviour in DWDS. Biofilms were analysed at different times in terms of biomass using crystal violet staining, metabolic activity was determined by the resazurin reduction assay and, morphology by epifluorescence, using calcofluor white M2R and DAPI, and bright field microscopies.

Results & Conclusions

The results confirmed that each individual species forms biofilms at 24, 48 and 72h with increasing biomass over time. Metabolic activity was higher at the 24h biofilms and then decreased overtime. Regarding mixed species biofilms, metabolic activity was higher when compared to single species biofilms at 24h and similar for the 48 and 72h biofilms. The results provided by microscopies allowed the understanding of the distribution of specific organisms in inter-kingdom biofilms.

References & Acknowledgments

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