Antibiotic Resistance Patterns and Permissiveness Towards Resistance Plasmids of Aeromonas in Residual Waters

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[P98] ANTIBIOTIC RESISTANCE PATTERNS AND PERMISSIVENESS TOWARDS RESISTANCE PLASMIDS OF AEROMONAS IN RESIDUAL WATERS

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Aeromonas is a genus of Enterobacteriaceae, prevalent in wastewater and often detected in aquatic environments. Some are opportunistic pathogens of humans and animals. Mobile antimicrobial resistance (AMR) determinants, such as plasmids, are also frequently detected in Aeromonas. These properties allow Aeromonads to be considered as an indicator of the dissemination of antimicrobial resistance between humans and the environment. Therefore, the aim of this study was to investigate the diversity and AMR profile of Aeromonas in Denmark, as well as their ability for uptake of resistance plasmids. Based on this information, we aimed to assess the contribution of wastewater treatment plant (WWTP) discharges to the spread of antibiotic resistance in the environment.

Aeromonas spp. were enumerated from both raw sewage and effluents of several WWTPs in Denmark, as well as from upstream and downstream locations of the receiving water bodies. The taxonomic diversity of the retrieved Aeromonas covered 13 species with A. media predominant in all samples. A. media, A. veronii and A. caviae were more abundant in wastewaters and river downstream the WWTP than upstream, while A. veronii were only detected in the effluent and downstream. Through susceptibility testing, we showed that resistance to piperacilin-tazobactam, cefepime, and tetracycline was detected downstream of WTTP, but not upstream. In addition, solid mating were performed between diverse Aeromonas strains and three model donors carrying the broad host range plasmid pKJK5. A. media, A. veronii, A. salmonicida, A. caviae and A. allosaccharophila can obtain plasmids from several donors with relatively high transfer rates. The fact that A. media, the species most detected in our sampling, is highly permissive to conjugal plasmids suggests that they could contribute significantly to environmental dissemination of mobile resistance genes.

Overall, we conclude that WWTP discharges may enhance the dissemination of antibiotic-resistant Aeromonads into surface water, thereby increasing the risk of spreading antibiotic resistance in the environment.