

ANTIBIOTIC RESISTANCE IN FRESHWATER CYANOBACTERIA – LIVESTOCK IMPLICATIONS.

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INTRODUCTION

Cyanobacteria (CB) are ubiquitous photoautotrophic microorganisms found in freshwater that carry out relevant ecological functions (primary/oxygen producers). In water environments, CB are exposed to antibiotic pollution, namely through contamination from livestock farming, and are considered quite sensitive to antibiotics. Despite their recognised ability to adapt to environmental stressors, the real impact of antibiotic pollution on freshwater CB is underexplored. Besides, in water reservoirs, CB contact with resistant bacteria can favour the acquisition/dissemination of antibiotic resistance genes (ARG) from/to other bacteria, namely animal pathogens. This might be a concern for livestock farms that use freshwater reservoirs as a source of animal drinking water. Thus, it is of major importance to investigate the contribution of CB to the aquatic resistome and the subsequent impact on the quality of water used in animal and food production systems. Therefore, the main purposes of this work were: i) to evaluate the susceptibility pattern of CB species to different antibiotics belonging to distinct classes; ii) to identify the presence of ARG in CB strains.

METHODOLOGY

The susceptibility of 43 freshwater cyanobacteria belonging to the Estela Sousa e Silva Algae Culture Collection (ESSACC) to several classes of antibiotic was evaluated by a microdilution assay adapted by our research group (Dias et al., 2015). Genomic DNA from those strains was extracted and High Throughput Sequencing approaches were employed to identify the presence of ARGs.

Dias, E., Oliveira, M., Jones-Dias, D., Vasconcelos, V., Ferreira, E., Manageiro, V. and Caniça, M. (2015) Assessing the antibiotic susceptibility of freshwater Cyanobacteria spp.. *Front. Microbiol.* 6:799. doi: 10.3389/fmicb.2015.00799.

RESULTS

Preliminary results indicate the reduced susceptibility of cyanobacteria to some antibiotics as well as the presence of resistance genes conferring resistance to antibiotics commonly occurring in water environments.

DISCUSSION

This work highlights the dual impact of antibiotic pollution on cyanobacteria. On the one hand, antibiotics might hamper cyanobacterial communities by interfering with their viability, which will have a negative impact on water ecosystems. On the other hand, cyanobacteria might adapt and acquire antibiotic resistance that will eventually be transmitted to other bacteria present in water environments, which might be relevant for livestock farming activities.

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