

The secretome of *Serratia marcescens* SM6 under oxidative stress conditions

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Motivation and Aim: Multidrug efflux pumps representing the membrane protein complexes play a significant role in a drug resistance and natural physiology of pathogenic bacteria such as *S. marcescens* [1]. Four different classes of efflux pumps were identified in the genome of *S. marcescens*. Clear understanding of the natural functions of efflux pumps is required for the development of new generation of antimicrobials to combat bacterial drug resistance. The objective of this work was to study the antioxidant effect of extracellular metabolites produced by environmental strain *S. marcescens* SM6 in response of oxidative stress and secreted in efflux pump MacAB-dependent fashion.

Methods and Algorithms: All experiments were performed in M9 medium at 37 °C in the presence/absence of hydrogen peroxide. Cell-free growth media used for cultivation of *S. marcescens* wild type SM6 or $\Delta macAB$ strains were passed through Supelco Discovery DSC-18 solid phase extraction C18 cartridges. Purification and fraction collection of metabolites was performed on an Acclaim® PolarAdvantage II (PA2) C18 reverse-phase column using UltiMate 3000 UHPLC system (Thermo Scientific, Dionex, USA).

Results: Cultivation of $\Delta macAB$ *S. marcescens* mutant strain in the presence of a hydrogen peroxide led to a drastic drop in bacterial viability. Interestingly, extracellular metabolites produced by *S. marcescens* SM6 wild type under oxidative stress conditions had a protective effect on the growth of *S. marcescens* $\Delta macAB$ in the presence of peroxide. HPLC analysis detected several unique peaks with retention time of 12.360, 12.757, 19.237, 23.317 и 24.797 min, respectively, that were present only in the extracts from conditioned media used for growth of *S. marcescens* wild type but not the $\Delta macAB$ mutant strain. Addition of these fractions to the peroxide-containing media rescued growth of $\Delta macAB$ mutant strain.

Conclusion: Results of this study show that hydrogen peroxide affected the composition of secreted metabolites of *S. marcescens* SM6. Particularly, HPLC analysis determined the presence of several peaks in the samples of the conditioned media used for growth of wild type strain SM6 under stress conditions.

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References

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