THE ANTIMICROBIAL ACTION OF PSEUDOMONAS AERUGINOSA BY-PRODUCTS IN THE CONTROL OF SINGLE AND MIXED BIOFILMS

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Introduction

Bacteria are often tolerant to conventional chemical agents, resulting in the need to develop new strategies for biofilm control. Secondary metabolites produced by certain bacteria represent important bioactive compounds, with pronounced antibacterial activity against other microorganisms. Such substances are accepted to be essential for their producers, inhibiting other bacteria that compete for common resources.

AIM: to investigate the antimicrobial effect of *P. aeruginosa* by-products on planktonic and mono- and polymicrobial sessile growth of several pathogenic bacteria

Methods

Supernatants from *P. aeruginosa* planktonic cultures (isolated and from collection) were tested on their own and on *S.aureus*, *S.epidermidis*, and *E.coli* lawns.

Their antimicrobial action, as biofilm growth media complement or as biofilm disruption agents, was also assessed in single Staphylococcus biofilm formation and in polymicrobial biofilms formed by Staphylococcus species together with Gram- bacteria.

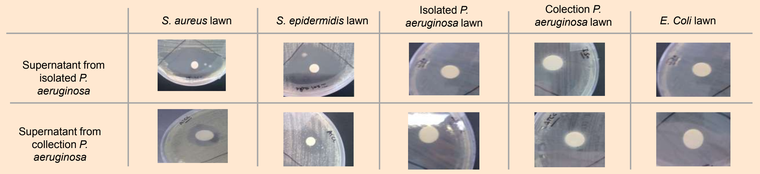
Biofilms were evaluated after 24 h through the following methods:


CV (Biomass)


XTT (Activity)

Results

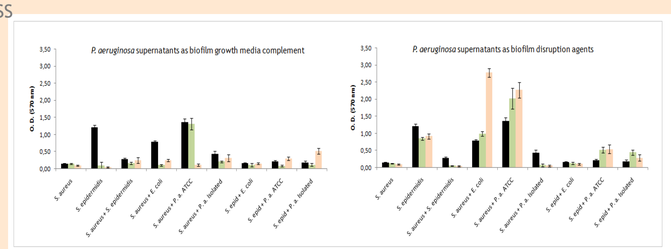
Effect of *P. aeruginosa* by-products on planktonic growth



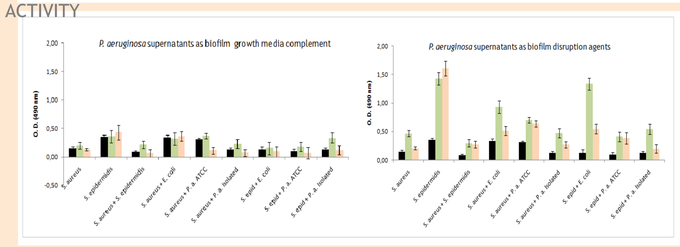
- In general, only Gram+ species lawns were inhibited by both isolated and from collection *P. aeruginosa* supernatants
- Isolated *P. aeruginosa* by-products showed the highest antimicrobial action against Staphilococcal planktonic growth.

Effect of *P. aeruginosa* by-products on single and mixed biofilms

BIOFILM MASS



METABOLIC ACTIVITY



- Regardless their mode of application, metabolites from both *P. aeruginosa* cultures showed ability to be anti-staphylococcal agents, inhibiting their single and mixed biofilms
- Mixed biofilms encompassing Gram+ and Gram- species were not disturbed by *P. aeruginosa* by-products, mainly when applied against pre-established biofilms
- In general, all mixed biofilms accumulated more mass and had more metabolic activity when submitted to the supernatants aggression.

Conclusions

- *P. aeruginosa* supernatants were effective only against Gram+ species planktonic growth
- *P. aeruginosa* by-products also showed anti-staphylococcal biofilms potential, regardless their mode of application.

However, *P. aeruginosa* metabolites failed in disturb biofilm consortia encompassing Gram- bacteria. This trait makes them quite ineffective chemical countermeasures against real biofilms

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