Antimicrobial susceptibility of *Aspergillus fumigatus* and *Stenotrophomonas maltophilia* biofilms: did they find strength in unity?

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*Aspergillus fumigatus* and *Stenotrophomonas maltophilia* (opportunistic gram-negative bacillus) form biofilms, especially in the airways of immunocompromised or cystic fibrosis (CF) patients where they are commonly co-isolated. Biofilms constitute a therapeutic challenge and very few data are available on polymicrobial (filamentous fungi and bacteria) biofilms susceptibility to antimicrobial agents. Our *in vitro* *A. fumigatus – S. maltophilia* biofilm model highlights an antagonistic relationship: *S. maltophilia* reduces growth of *A. fumigatus* and induces fungal phenotype modifications\(^\text{1,2}\).

**Do polymicrobial interactions in biofilm module the susceptibility of pathogens to antimicrobial agents?**

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**Figure 1: *A. fumigatus* susceptibility after exposure to increasing concentrations of amphotericin B.** Percentage of inhibition of fungal biomass after treatment with AMB compared to untreated conditions in fungal and polymicrobial biofilms. *p < 0.05, Wilcoxon.*

**Figure 2: *S. maltophilia* susceptibility after exposure to increasing concentrations of levofloxacin.** Percentage of inhibition of bacterial biomass after treatment with LVX compared to untreated conditions in bacterial and polymicrobial biofilms. *p < 0.05, Wilcoxon.*

**Figure 3: Effect of proteinase K pretreatment on SM_REF susceptibility to LVX in polymicrobial biofilm.** PK: proteinase K (50 µg/mL), enzymatic degradation of the matrix; LVX: Levofloxacin (1 µg/mL). *Wilcoxon, p = 0.0024.*

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**The fungal biomass appears to provide a protective coating that reduces the bacterial susceptibility.**

**A. fumigatus** is more susceptible to AMB in polymicrobial biofilm

**S. maltophilia** is less susceptible to LVX in polymicrobial biofilm

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**The polymicrobial biofilm may be benefit for *S. maltophilia* to fight levofloxacin especially through the *A. fumigatus* ECM.** In contrast, the antagonism of *S. maltophilia* against *A. fumigatus* observed in polymicrobial biofilm could increase its susceptibility to amphotericin B. To eradicate both pathogens in polymicrobial biofilm, combination of amphotericin B with levofloxacin could be an interesting antimicrobial option.

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**Material & Methods**

**Susceptibility testing:**
- qPCR: fungal / bacterial biomass quantification
- CFU: bacterial viability quantification

**LVX activity against SM**

**LVX does not affect the efficacy of AMB against AF**

**Amb + LVX is more active against SM in polymicrobial biofilm than LVX alone**

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