Title: Assessing the antifungal resistance of silver nanoparticles against *Aspergillus niger* isogenic mutants

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Nanotechnology is currently one of the most expansive fields of research, with diverse applications across various disciplines (He & Hwang, 2016). In the field of food microbiology, metal nanoparticles, particularly silver nanoparticles, are predominantly employed to inhibit the development of microorganisms within different systems (Li et al., 2017). This study investigates the antifungal effects of silver nanoparticles on six *Aspergillus niger* mutants. The mutants, N402, TLF39, TLF93, TLF95, TLF96, MA2.34, were exposed to varying concentrations of silver nanoparticles, and comparisons were drawn based on the presence or absence of specific genes (van Leeuwe et al., 2020). The diameter of the fungal mycelium was measured every 12 hours until the entire Petri dish of the control was colonized, about 7-10 days. The slope of the mycelium diameter increase over time was used to determine the growth rate (Sardella et al., 2017, 2019). Additionally, this research placed significant emphasis on evaluating the "work to be done", which refers to the amount of work that a cell has to perform to adapt to new environment of the silver nanoparticles (Ag NPs)(Swinnen et al., 2004). Notably, among the six studied mutants, the TLF95, which exhibits the most extensive gene deletions (ΔkusA::DR-amdS-DR, ΔagsA, ΔagsE) (van Leeuwe et al., 2020) affecting the fungal cell wall, demonstrated the highest "work to be done," whereas the wild-type strain N402 exhibited the lowest. To conclude, the antifungal effects of silver nanoparticles on *Aspergillus niger* mutants are influenced by their genetic composition, with TLF95 showing the highest adaptation effort and N402 the least. Gene deletions, particularly affecting the cell wall, play a key role in nanoparticle susceptibility.

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