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Synthesis of two novel Cu(II)-quinoxaline complexes. Inhibition of growth and aflatoxin B_1 production of *Aspergillus parasiticus*

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Statement of the Problem: Enormous interest of coordination compounds of transition metal ions is due to their various biological significance as well as unique catalytic, photochemical and optical properties. Copper complexes have been much explored due to the fact that copper is bio-essential element responsible for numerous bioactivities in living organism. It is well known that Cu(II) complexation plays an important role in the pharmacological profile of the antimicrobial activities. Several agricultural products are annually contaminated with mycotoxigenic fungi. The mycotoxin contamination is a major priority in food safety and a serious health issue for the consumers. Taking all these under consideration there is great need in finding ways to control pre-/post-harvest crops contamination.

Methodology & Theoretical Orientation: The aim of the study was the synthesis of two novel Cu(II)-complexes, $[Cu(pq)_2(NO_3)](NO_3)$ and $[Cu(pq)(NO_3)](NO_3)$ and the potential usage of these compounds as anti-fungal and anti-aflatoxigenic agents. The anti-fungal activity was investigated in the microbiological medium *Aspergillus Flavus Parasiticus* Agar (AFPA) by daily measurements of the mycelial growth of *Aspergillus parasiticus*. These complexes were also studied for their ability to inhibit the aflatoxin B1 (AFB1) production by the same fungus in the microbiological medium Yeast Extract Sucrose (YES). All experiments took place both in dark conditions and after irradiation, to extract comparable results.

Findings: The results showed that the $[Cu(pq)_2(NO_3)](NO_3)$ displayed the highest inhibition of the fungus growth both in dark conditions and under irradiation, 33% and 57%, respectively. Moreover, the $[Cu(pq)(NO_3)](NO_3)$ caused fungus stimulation in both conditions by 20% and 45%, respectively. As far as the anti-aflatoxigenic efficacy concerns the $[Cu(pq)_2(NO_3)](NO_3)$ inhibited the AFB1 production by 8% (dark conditions) and 15% (under irradiation).

Conclusions & Significance: To conclude, we demonstrated that $[Cu(pq)_2(NO_3)](NO_3)$ under irradiation (400-800 nm) is capable of reducing AFB1 production and fungal growth in a higher extent.

Biography

Eutuxia Lioli is a Chemist (MSc) and has her expertise in Inorganic Chemistry. She graduated from National and Kapodistrian University of Athens. She is pursuing her PhD in Chemistry focusing on Inorganic Chemistry. Her research aims at designing novel metal compounds with potential applications as anti-cancer and anti-fungal agents. Her field research is synthesis and characterization of metal-complexes, DNA-binding studies, cytotoxicity measurements and food microbiology/toxicology studies.

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