5-ALA: *in vitro* Effects as a Photosensitising Agent for Inactivation of Opportunistic Fungi

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Background: The incidence of fungal infections have increased in recent decades, particularly due to the increase in the immunocompromised population. Opportunistic fungal infections were identified as significant causes of mortality and morbidity in this population. In addition, multidrug resistance (MDR) patterns detected in fungal species limit the efficacy of antifungals. Photodynamic inactivation was identified as a novel antimicrobial method of treatment with increased interest towards 5-Aminolevulinic acid (5-ALA). It was found that when metabolized to Protoporphyrin IX (PpIX), a photosensitizing agent, irradiated with light, membrane damage was detected.

Objective: To evaluate the potential of 5-ALA as an in vitro photosensitizing agent for antimicrobial photodynamic inactivation of opportunistic fungi.

Method: CFU/ml cultures of Candida albicans and Cryptococcus neoformans were subjected to varying concentrations of 5-ALA and light intensity using 400 W halogen lamp. Surviving colonies were then recorded after 48 hours at 37 °C.

Result: Preliminary results showed that Cryptococcus neoformans colonies were significantly reduced at 1 M 5-ALA and 200 J/cm^2.

Conclusion: Future work on extraction of intracellular PpIX is needed to determine the potential of this alternative method for the inactivation of opportunistic fungi.

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Nonlinear Optical Studies of Gold and Silver Nanoparticles

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Objective: To measure the nonlinear refractive index and nonlinear absorption coefficient of Ag and Au particles.

Design: A Quantitative Measurements.

Setting: Royal College of Surgeons in Ireland (RCSI), Kingdom of Bahrain.

Method: Ag and Au colloidal solutions were prepared by reduction processes. The nonlinear properties of the samples were investigated using CW laser at 488-514 nm using Z-scan technique.

Result: Closed aperture z-scan displayed a pre-focal peak followed by a post-focal valley. These materials showed a large negative nonlinear refractive index of 5.85 X 10^{-11} m^2/W and 3.32 X 10^{-12} m^2/W for silver and gold respectively and negative nonlinear absorption of 3.45 x 10^{-4} m/W and 7.48 x 10^{-5} m/W for silver and gold respectively.

Conclusion: Z-scan showed that Ag and Au nanoparticles exhibit a nonlinear effect of thermal origin.

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