### Application of photodynamic therapy in reduction in vitro of pathogenic fungus *Sporothrix schenckii*

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The sporotrichosis is a disease affected by lymphatic vessels, skin and some internal organs. There is higher prevalence of chronic mycosis from pathogenic fungus *Sporothrix schenckii* in tropical regions. The aim of this in vitro study was to evaluate the susceptibility of *S. schenckii* to effects of photodynamic therapy (PDT). In the methodology, standardized viable cells (0.1 ml) (106 cells/ml) were separated into groups ($n = 5$): G1 – low power laser (660 nm) (35 mW, 10 J, 285 s, 0.38 $cm^2$ spot size, 26.3 J/$cm^2$) and photosensitizer (0.1 mg/ml methylene blue) (L+P+), G2 – laser and no photosensitizer (L+P−), G3 – no laser and photosensitizer (L−P+), G4 – no laser and no photosensitizer (L−P−). After microbiological laboratorial processing, it was performed the count of the colony forming units (CFU). The data were analyzed by Kruskall Wallis statistical test. The results showed medium (minimum–maximum) values (log CFU/ml) to G1 (0)(0–0)a, G2 (3.21)(3.16–3.23)b, G3 (3.22)(3.14–3.26)b, G4 (3.24)(3.12–3.30)b, demonstrated that G1 showed no growth and statistically higher effects of PDT than other groups ($p < 0.05$), there is no statistically differences between remains groups in microbial growth ($p > 0.05$). The parameters of this study can conclude the effective and viable of PDT in inactivation of this microorganism.

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### Photodynamic therapy inhibits the antimicrobial effects of bacteriophage therapy in a invertebrate model of systemic infection

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Multidrug-resistant *Pseudomonas aeruginosa* strains have disseminated worldwide contributing with antibiotic treatment failures encouraging the search for alternative therapeutic options against associated infections. Photodynamic therapy (PDT) is an emerging therapeutic modality that is effective against a broad spectrum of multi-resistant pathogens. Bacteriophage therapy uses viruses capable of infecting specific bacterial strains and rapidly replicate to finally lyse the host cell and consecutively infect other bacteria. Specific bacterial receptors are necessary for phages to bind and infect the target cell. Consequently, eukaryotic cells cannot be infected and the specific bacterial receptors must be in the correct conformation to allow viral infection. In this study we to evaluated the effects of bacteriophage and photodynamic therapies against multidrug-resistant *P. aeruginosa* using a *Galleria mellonella* model of systemic infection. Bacteriophage therapy and PDT were employed according to previously established protocols. Significant bactericidal activity was achieved in vitro by bacteriophage and photodynamic therapies. Interestingly, while in vivo the effectiveness of bacteriophage therapy was confirmed, PDT did not present statistical difference to sham control and furthermore inhibited the bacteriophage action. Bacteriophage therapy can represent an interesting alternative or adjuvant approach to control *P. aeruginosa* systemic infections, however, MB-mediated PDT can inhibit bacteriophage therapeutic action via unrevealed mechanisms.

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### Dental bleaching efficacy with light application: In vitro study

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Dental bleaching is a cosmetic procedure done in many dental offices. Tooth whitening has been the subject of several studies. Nowadays the procedure involved the use of oxidant agents with or without the use of light. The objective of this study is to determine the influence of light irradiation protocols about getting better cosmetic results using colorimetric spectrophotometer who measures color changes carried in vitro. For this utilized twelve bovine incisors, were selected based on similar anatomical features. Bovine teeth were divided into two treatment groups: hydrogen peroxide gel to 35% and only light violet LED. A commercial spectrophotometer was used to measure the color changes during the course of the experiment and the data were analyzed and compared. The data obtained show teeth whitening using only light violet LED. Based on our results, we conclude that the only use of light can produce enough energy to break pigments in the enamel so that bleaching occurs.

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### Effects of photodynamic therapy with red light and different photosensitizers as mouth rinse for oral desinfection

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Photodynamic therapy is a procedure associating drug and light source, resulting in a contamination decrease. Possibility to reduce microrganism contamination into oral enviroment using a very simple method suggested this study. We evaluated the effects of a rinse with photosensible solution on the pathogens of salivary flora. A randomized clinical trial was performed with eighty patients. Eight different groups were analyzed: G1 – Clorine 0.05% + light; G2 – 3% hydrogen peroxide + Metilene Blue 0.05% + light; G3 – 3% hydrogen peroxide + Porfirin 0.05% + light; G4 – Porfirin 0.05% + light; G5 – Metilene Blue 0.05% + light; G6 – Clorexidine 0.12%; G7 – Clorexidine 0.12% + light; G8 – Clorine 0.05%. Irradiation parameters were: 640 ± 5 nm; 180 mW/$cm^2$; 60 J/$cm^2$; irradiation time of 15 min. Saliva samples were collected for bacterial counts at baseline and after the experimental phase (30 min and 24 h). Samples were cultured on blood agar plates in microaerophilic conditions. Number of colony-forming units was determined. Two-way and one-way ANOVA were used. Post hoc