among them. The CFU/mL and XTT assay revealed that PDT reduced the adhesion of cells compared with P+L−, P−L+ and P−L− groups, whose values showed no difference either.

Conclusion: PDZ-mediated PDT reduced the cell viability and adhesion ability of Car.

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Comparison of the efficiency of rose bengal and methylene blue as photosensitizers in photodynamic therapy techniques aiming at *Enterococcus faecalis* inactivation

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The aim of this in vitro study was to compare the efficiency of photodynamic therapy (PDT) techniques based on different photosensitizers (PS): rose Bengal (RB) and methylene blue (MB), to reduce *Enterococcus faecalis*. In our experiments, we used MB (0.01%) for the photoinactivation of *Enterococcus faecalis*, with a 660 nm laser as the excitation source and RB (25 μmol/l) associated with a green light laser source (532 nm). Saline solution was used for the control group (CG). The colony forming units (CFU/ml) were counted after 24 h at 37 °C, and statistical analysis was performed using ANOVA ($p < 0.05$). Results showed significant reduction in the number of CFU/ml in the RB group (0.12×108) when compared to the CG (2.82×108 CFU/ml), as well as when compared to the MB group (2.66×108). Interestingly, for the concentrations used in the experiments, the MB group showed no significant bacterial reduction when compared to the CG. Our results indicate a higher reduction of *Enterococcus faecalis* CFU/ml when RB is used as a photosensitizer as compared to MB. We conclude that the PDT technique could be improved if RB is used in association with a green light laser source, for the inactivation of *Enterococcus faecalis*.

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Evaluation of the molecular mechanisms of bacterial resistance in *Pseudomonas aeruginosa* by FTIR microspectroscopy

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Pseudomonas aeruginosa is a Gram-negative bacteria belonging to the group of non-glucose fermenting associated with high mortality, morbidity, mortality and prevalence in hospital settings. Being found from respiratory equipment to antiseptic gels operating room. This ability to adapt to different environments is due to changes at the molecular level where it is modulated and combined multiple resistance mechanisms ensuring adaptation and survival. Understand the different stages of adaptation of the organism based on molecular and biochemical changes modulated by its genome by FTIR microspectroscopy can contribute to the search of new technologies for development of antimicrobial or bacteriostatic strategies that impact directly on the resident microbiota.

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Effectiveness of Hypericin in decreasing the population of *Propionibacterium acnes*

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The acne is caused by an infectious manifestation of *Propionibacterium acnes*, a Gram positive bacteria which can be treated by photodynamic therapy, being effective with no adverse effects. Hypericin is a hydrophobic photosensitizer presenting high photodynamic activity, and important properties highlighting the high quantum yield of generation of singlet oxygen and a low dark toxicity. Experiments with *P. acnes* were carried with four groups: (1) Control group (untreated), (2) with Hypericin, without the presence of light, (3) light without Hypericin to evaluate the toxicity of the light and (4) photoinactivation with incubation time of 2.5 min, concentration of 10 μg/ml of Hypericin and light dose 6–12 J cm^{-2} with yellow LED (590 ± 11 nm), performing the bacteria quantitation by XTT. The results showed that Hypericin is not toxic to *P. acnes* when not irradiated and light itself shows some toxicity due the presence of endogenous porphyrins that can absorb light. The group with 10 μg/ml hypericin submitted to 6 J cm^{-2} showed survival index of 65% while the group with the same treatment but with 12 J cm-2 presented 47% of survival index. It was found that Hypericin, leads to a significant reduction in the population of *P. acnes*.

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Morphological evaluation of *Candida albicans* after photodynamic therapy

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This study aimed to evaluate the morphology variation of the fungus *Candida albicans* in different growth phases and following antimicrobial photodynamic therapy (aPDT) mediated by methylene blue (50 μM) and exposure to a 660 nm-LED ($P = 360$ mW). For this task, scanning electron and atomic force microscopy techniques were employed. Pre-irradiation time was 10 min and exposure times were 12, 15 and 18 min. The photosensitizer or light alone did not show any fungicidal activity. aPDT on fungal cells in lag phase (6 h) or exponential phase (24 h) showed more than 1 log reduction of viable cells following 15 min of irradiation. Total inactivation of cells was obtained after 18 min of irradiation. In stationary growth phase (48 h), fungal reduction was fluence-dependent, however, complete reduction was not achieved. Micrographs revealed flatter, and less rounded cell morphology after aPDT. Regarding the different stages of growth, younger cells have less amount of extracellular slime compared to older cells. After aPDT, we observed a clearer environment, most evident in the older cells. We concluded that slime presence can be an obstacle for aPDT in yeast, therefore for a good clinical outcome aPDT should be performed aiming two different targets: the slime surrounding cells and the cells itself.

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