

PHOTODYNAMIC THERAPY

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INFLUENCE OF THE DYE SOLVENT ON THE PHOTODYNAMIC ANTIMICROBIAL EFFECT OF PHENOTHIAZINIC DYES

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Photodynamic antimicrobial therapy (PAT) may become an useful clinical tool to treat microbial infections, overcoming microbial resistance that is a major problem nowadays regarding infectious disease. Few clinical or clinical oriented studies in PAT are currently available and *in vitro* studies present a noteworthy variance on the used parameters.

The aim of this study is to evaluate the role of the dye solvent regarding dimerization process, and photodynamic efficiency. Methylene Blue (MB) and Orto-Toluidine Blue (TBO) were evaluated in concentrations ranging from 5 μ M to 3mM in two different solvents: deionized water and saline solution, through optical absorption spectroscopy and fluorescence emission spectroscopy. The tested solvents were analyzed via dissolved oxygen availability, and also the singlet oxygen emission at $\lambda=1270$ nm was evaluated in the same dye concentration. Microbiological evaluations were performed in cultures of *Escherichia coli* in stationary phase to verify the solvent influence on the two photosensitizers in concentrations of 30 μ M.

The results show that the ratio of monomer/dimer for TBO and MB in saline solution is smaller than in water. The singlet oxygen emission from a MB solution presented a higher signal in water than in saline. The microbiological analyses demonstrated an increased lethal photosensitization for dyes in water.

These results indicated the importance of the studied parameter, the influence of the solvent on the final result and the importance of the monomer/dimer ratio on the dye photochemistry, therefore to design a clinical oriented study these parameters must be taking into account.