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EFFECT OF THE DYE CONCENTRATION ON THE PHOTODYMANIC EFFICIENCE OF PHENOTHIAZINE METHYLENE BLUE

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Photodynamic antimicrobial therapy (PAT) may become a 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 concentration regarding dimerization process, and photodynamic efficiency. Methylene Blue (MB) was evaluated in concentrations ranging from 5 μ M to 3mM, through optical absorption spectroscopy and fluorescence emission spectroscopy, Also, two sets of experiments were performed mixing the dye with human saliva and a mixture of red blood cells and serum. The results indicated that the dynamic of aggregation was directly proportional with concentration increasing, a blue shift on the dyes maximum absorption can be readily observed upon increasing concentration. The addition of body fluids also leads to an increase dimerization even with maintenance of the concentration. The importance of the monomer/dimer ratio on the dye photochemistry, could be accessed via fluorescence spectroscopy and a shift in the type of predominant reaction from type II to type I was confirmed. Therefore to design a clinical oriented study the dye concentration has to be carefully evaluated in terms of aggregation and photochemical behavior of the dye.