

P75

The role of light irradiance on methylene blue photodegradation dynamics: Is all light equal?

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Methylene blue (MB) is a well-known photosensitizer (Ps) commonly used for antimicrobial photodynamic therapy (aPDT). Usually aPDT parameters evaluation involves Ps concentration, its quantum yield for singlet oxygen production (Type II reaction) and the Ps photobleaching rate as a function of the delivered fluence plus oxygen concentration and consumption on the medium. The role of power density is not often considered. The aim of this study is to evaluate the role of power density over MB photobleaching dynamics evaluating the dimer/monomer ratio as well as the leuco MB formation under discrete changes in power density keeping the same light fluence. The MB was irradiated using a $\lambda = 660\text{nm}$ diode laser (TwinLaser, MMOptics, São Carlos, Brazil), 40mW adjustable from 10 to 10mW, 0.04cm^2 . The powers of 10mW, 20mW, 30mW and 40mW were used for 300s, 150s, 100s and 75s respectively. The irradiations were carried out directly in a cover quartz cuvette with an optical path of 1 cm. An acrylic mask was made to ensure the coincidence between the irradiation and the reading points. The readings were made from $\lambda = 200\text{nm}$ to $\lambda = 700\text{nm}$ and analyzed in appropriate software. The DA (dimer absorption) /MA (monomer absorption) was calculated and the ratio between visible and ultraviolet absorption was also calculated. Figure 1 shows the result of DA/MA for the different irradiances.

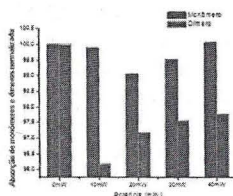


Figura 1 – MB dimer / monomer normalized absorption rate as a function of the irradiance with same fluence

Our results demonstrated that discrete changes in light irradiance leads to different dynamics in terms of photobleaching and DA/MA ratio.

1-Tuite EM and Kelly JM, J Photochem Photobiol B: Biol; 21(1999) 103.
2- Usacheva MN, Teichert MC, Biel MA, J Photochem Photobiol B: Biol; 71 (2003) 87.
3- Ferreira J, Moriyama T, Kurachi C, de Castro e Silva O, Sibata C, Bagnato VS., Proceed Spie; 5689 (2005)227.
4- Virkutyte J, Baruwati B and Varma RS, Nanoscale (2010) 1109.

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This study evaluated the antimicrobial activity of a diode laser and antimicrobial photodynamic therapy (aPDT) on dentine samples of 3x3 mm containing *S. aureus* biofilm simulating a periodontal pocket. The samples were treated using an 808nm diode laser (interval) or aPDT using 10mW methylene blue and H₂O₂. The antimicrobial activity was evaluated by morphology analysis and period of treatment using SEM images. The DA/MA ratio was measured with SEM images and bioluminescent analysis showed that the recontamination after aPDT presented significant difference after treatment, with indication that aPDT group did not show temperature rise or superficial damage to patients, such as periodontitis.