

Photosensitizing effect of visible blue light emitted from dental curing units on selected microorganisms

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Abstract:

This in-vitro study was done to evaluate the phototoxic effects (if any) of visible blue light emitted from quartz-tungsten-halogen (QTH) and light emitting diode (LED) light-curing units (LCUs) at clinically relevant durations and distances on *Streptomyces* microorganisms. Locally isolated *Streptomyces* and Methicillin-resistant *Staphylococcus aureus* (MRSA) were selected for this study. Two commercially available visible blue light sources were used in the current study: Optilux 501 QTH and Ultra-Lume LED 5 dental LCUs. The study was designed used to test the ability of cultivated *Streptomyces* isolates to produce antibiotics after exposure to QTH and LED light sources for clinically relevant times (40, 80 and 120 seconds) at different distances (1,5 and 10 mm). Extra discs of *Streptomyces* not exposed to light were served as control for comparison. LED and QTH LCUs (at 1 and 10 mm distances) showed negative results (no antibiotic inhibition zones) around *Streptomyces* isolate disks at different interacted exposure distances and durations similar to that of control group. Meanwhile, QTH light source at 5 mm distance showed positive results (production of inhibition zones) with the different tested exposure durations. Applying Tukey HSD Post-hoc multiple comparison test to this positive group, it was shown that, there was a statistical significant difference ($P < 0.5$) between the mean values of inhibition zone diameter recorded at 40 and 80 seconds and also between those recorded at 80 and 120 seconds. Contrarily, there was no statistical significant difference ($P < 0.5$) between the mean values of inhibition zone diameter recorded at 40 and 120 seconds. The results of the present study might be served as a break-through finding on both beneficial therapeutic and detrimental phototoxic effects of blue visible light emitted from dental LCUs.

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