

Perancangan prototipe light curing unit-light emitting diode (LCU-LED) dengan metode pulse width modulation (PWM) = Prototype design of light curing unit-light emitting diode (LCU-LED) using pulse width modulation (PWM) method

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20404357&lokasi=lokal>

Abstrak

Pemakaian LCU dengan irradiansi tinggi secara medis berpotensi merusak jaringan pulpa gigi akibat kenaikan suhu yang ditimbulkan. Tujuan penelitian ini adalah memperoleh prototipe LCU menggunakan High Power LED dengan 3 mode Pulse Width Modulation (PWM) untuk mengontrol sinar irradiansi sinar output pada mode 1 dengan irradiansi 800 mW/Cm², mode 2 dengan irradiansi 900 mW/Cm², mode 3 dengan irradiansi 1.000 mW/Cm² yang berdurasi 5 detik, 10 detik dan 20 detik dan suhu sinar output 37 °C. Lampu yang digunakan LED biru high power komersial Model LZ4-00DB10 sebagai sumber sinar. Pengukuran irradiansi dan suhu dengan menggunakan LED Radiometer dan Thermocouple. Pada penelitian ini dihasilkan Prototipe LCU LED dengan metode kombinasi Pulse Width Modulation pada Mode 3 irradiansi $999 \pm 3,16$ mW/cm² dan suhu sinar output 38,76 °C dengan durasi waktu penyinaran 20 detik. Pengaturan kombinasi PWM perlu disempurnakan lagi agar irradiansi diatas 1000 mW/cm² dapat tercapai, sedangkan suhu sinar output LCU LED dapat terkendali tidak melebihi 37 °C.

.....LCU with high irradiance medically potentially damage the dental pulp tissue due to the temperature rise caused objective of this study is to obtain a prototype LCU using High Power LED with 3 modes Pulse Width Modulation (PWM) to control the output light beam irradiance in mode 1 with irradiance of 800 mW / cm², mode 2 with irradiance of 900 mW / cm², mode 3 with irradiance of 1,000 mW / cm² which lasts 5 seconds, 10 seconds and 20 seconds and the temperature of the output beam 37°C. Commercial high power blue LED as a light source LZ4- 00DB10 model.

Irradiance and temperature measurement using the LED Radiometer and Thermocouple. In this study produced prototype LED LCU with a combination method Mode Pulse Width Modulation at 999 ± 3 irradiance of 3.16 mW / cm² and a temperature of 38.76°C output beam with a duration of 20 seconds exposure time. PWM combination settings need to be revised so that the irradiance above 1000 mW / cm² can be achieved, while the temperature of the output beam can be controlled LED LCU not 37°C.