

Septia Budi Lestari, 2020, Penetapan Dosis Energi Laser Dioda Biru Dengan Kurkumin Sebagai Fotosensitizer Untuk Inaktivasi Bakteri Patogen Gigi. Skripsi ini dibawah bimbingan Prof. Dr. Suryani Dyah Astuti, M.Si dan Samian, S.Si, M.Si, Program Studi S1 Fisika, Departemen Fisika, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.

ABSTRAK

Telah dilakukan penelitian Photodynamic Inactivation (PDI) sebagai salah satu metode dari fotodinamik terapi yang mengkombinasi cahaya laser dioda biru (405 nm) dengan fotosensitizer kurkumin sehingga menghasilkan oksigen reaktif yang menyebabkan kerusakan sel pada target. Penelitian ini bertujuan untuk mengetahui dosis energy yang optimal untuk inaktivasi bakteri dengan penambahan fotosensitizer kurkumin 20% untuk mereduksi bakteri gram negatif *Aggregatibacter actinomycetemcomitans* dan gram positif *Enterococcus faecalis* yang merupakan bakteri pemicu kerusakan gigi. Metode yang digunakan adalah penyinaran laser dioda biru terhadap bakteri dengan penambahan kurkumin dan Total Plate Count (TPC) untuk mengetahui penurunan viabilitas bakteri dalam satuan CFU/ml. Hasil uji menunjukkan bahwa fotodinamik inaktivasi dengan laser dioda biru dan kurkumin dapat menurunkan viabilitas bakteri. Penyinaran selama 180 detik dengan dosis $1,59 \text{ J/cm}^2$ memberikan hasil kematian bakteri terbanyak. Persentase kematian bakteri *Aggregatibacter actinomycetemcomitans* sebesar $(57,8 \pm 0,8)\%$ tanpa fotosensitizer, dan dengan fotosensitizer persentase kematian bakteri meningkat menjadi $(96,3 \pm 0,8)\%$. Sedangkan persentase kematian bakteri *Enterococcus faecalis* sebesar $(63,7 \pm 1,29)\%$ tanpa fotosensitizer, dan dengan tambahan fotosensitizer meningkat menjadi $(94,3 \pm 0,8)\%$.

Kata kunci : Fotoinaktivasi, Fotosensitizer, Laser Dioda , *Aggregatibacter actinomycetemcomitans*, *Enterococcus faecalis*.

Septia Budi Lestari, 2020, Determination of Blue Diode Laser Energy Dosing With Curcumin As Photosensitizer For Inactivation Of Dental Pathogenic Bacteria. This thesis is under the guidance of Prof. Dr. Suryani Dyah Astuti, M.Si and Samian, S.Si, M.Si, S1 Physics Study Program, Department of Physics, Faculty of Science and Technology, Airlangga University, Surabaya.

ABSTACT.

Photodynamic Inactivation (PDI) research has been carried out as one a method of photodynamic therapy that combines a blue diode laser light (405 nm) with curcumin photosensitizer to produce reactive oxygen which causes cell damage in the target. This study aims to determine the optimal energy dose for bacterial inactivation with the addition of 20% curcumin photosensitizer to reduce the gram-negative bacteria *Aggregatibacter actinomycetemcomitans* and gram-positive *Enterococcus faecalis* which are the bacteria that trigger tooth decay. The method used was a blue diode laser irradiation against bacteria with the addition of curcumin and Total Plate Count (TPC) to determine the decrease in bacterial viability in units of CFU / ml. The test results showed that photodynamic inactivation with blue diode laser and curcumin could reduce bacterial viability. Radiation for 180 seconds at a dose of 1.59 J / cm² gave the most bacterial death results. The death percentage of *Aggregatibacter actinomycetemcomitans* bacteria was (57.8 ± 0.8)% without photosensitizer, and with a photosensitizer, the percentage of bacterial death increased to (96.3 ± 0.8)%. Meanwhile, the mortality percentage of *Enterococcus faecalis* bacteria was (63.7 ± 1.29)% without photosensitizer, and with the addition of photosensitizer increased to (94.3 ± 0.8)%.

Keywords : Photoinactivation, Photosensitizer, Laser Diode, *Aggregatibacter actinomycetemcomitans*, *Enterococcus faecalis*.