

Efek Antibakteri Larutan Ekstrak Daun Jeruk Purut Terhadap Biofilm Bakteri *Enterococcus Faecalis* = Antibacterial Effect of Lime Extract Against *Enterococcus Faecalis* Biofilm

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Abstrak

Latar belakang: Jeruk memiliki khasiat untuk kesehatan karena mengandung vitamin, antioksidan, dan senyawa lain. Jeruk purut (*Citrus Hystrix*) merupakan jenis jeruk yang memiliki senyawa fenol yang tinggi. Jeruk purut memiliki potensi antibakteri terhadap bakteri Gram-positif dan Gram-negatif. Daun jeruk purut mengandung senyawa bioaktif seperti flavonoids, fenolik, tannin dan minyak esensial. Pada fase vegetative, kandungan flavonoid jeruk purut tertinggi pada daun tua. Efek antibakteri flavonoids adalah dengan mekanisme menghambat sintetik asam nukleat, menghambat fungsi membran sitoplasma sel, dan merubah permeabilitas membran sehingga memengaruhi sifat patogenitas bakteri Tujuan: Mendapatkan perbedaan efek antibakteri berbagai konsentrasi larutan ekstrak daun jeruk purut terhadap biofilm *Enterococcus faecalis*. Mendapatkan perbedaan efek antibakteri larutan ekstrak daun jeruk purut konsentrasi 2,5%, 5%, 10% dan 20% dan NaOCl 2,5% terhadap bakteri *Enterococcus faecalis*. Metode: Empat kelompok sampel diuji dengan larutan ekstrak daun jeruk purut masing masing 2,5%, 5%, 10%, dan 20%. Kelompok kontrol positif dilakukan pemaparan NaOCl 2,5%, dan kelompok kontrol negatif tanpa perlakuan. Efek antibakteri dilihat dari jumlah koloni pada media BHI agar. Hasil: Rerata koloni bakteri *Enterococcus faecalis* dari masing masing kelompok dengan nilai $p=0,00$ (berbeda bermakna). Nilai koloni tertinggi pada kelompok kontrol negatif dan larutan ekstrak daun jeruk purut 2,5% dan terendah pada kelompok kontrol positif dan larutan ekstrak daun jeruk purut 20%. Kelompok ekstrak daun jeruk purut dengan konsentrasi 2,5%, 5%, 10% dan 20% menunjukkan perbedaan bermakna dengan kompos positif NaOCl 2,5% dan kelompok kontrol negatif. Kelompok ekstrak daun jeruk purut dengan konsentrasi 2,5% juga memiliki perbedaan bermakna dengan konsentrasi 10% dan 20%. Kesimpulan: Konsentrasi larutan ekstrak daun jeruk purut 20% memiliki efek antibakteri *Enterococcus faecalis* yang paling baik dibandingkan pada konsentrasi 10%, 5%, 2,5%. Efek antibakteri larutan ekstrak daun jeruk purut 2,5%, 5%, 10% dan 20% terhadap bakteri *Enterococcus faecalis* lebih rendah dibandingkan dengan larutan NaOCl 2,5%.

.....Citrus contains vitamin, antioxidant, and other compounds that beneficial to the health. Lime (*Citrus Hystrix*) contains high concentration of phenol that has antibacterial potential against gram-positive and gram-negative bacterias. Lime leaf contains bioactive compounds such as flavonoids, phenolic, tannin, and essential oils. In vegetative state, old lime leaf contains the highest concentration of flavonoids. Flavonoids inhibit synthetic of nucleatic acid and citoplasmic cell membrane's function of bacteria, and affect bacterial pathogenetic by altering its membrane permeability. Objective: To obtain the difference of antibacterial effects of various lime extract concentration (2,5%; 5%; 10%; and 20%) and 2,5% of NaOCl against *Enterococcus faecalis* biofilm. Methods: Four sample groups tested using 2,5%; 5%; 10%; and 20% concentration of lime extract. 2,5% concentration of NaOCl was used as positive control group and no treatment was used as negative control group. Antibacterial effects were observed by the amount of bacterial colonies in BHI agar. Results: The mean of *Enterococcus faecalis* in each group with $p=0.00$ (significant). Negative control group and 2.5% lime extract concentration group had the highest amount of bacterial

colonies. Positive control group and 20% lime extract concentration group had the lowest amount of bacterial colonies. All sample groups showed significant difference with positive and negative control group. 2.5% lime extract group had significant difference with group of 10% and 20% lime extract concentration. Conclusion: 20% lime extract concentration showed higher potential of antibacterial against *Enterococcus faecalis* than 2,5%; 5%; and 20% concentration. Antibacterial effects of lime extract in every concentration groups were lower than 2,5% NaOCl