

INHIBITION OF CALCIUM HYDROXIDE AND PROPOLIS COMBINATION ON GLUCAN PRODUCED BY *Lactobacillus acidophilus***ABSTRACT**

Background: *Lactobacillus acidophilus* is one of the bacteria that cause dentin caries. *Lactobacillus acidophilus* has glucosyltransferase enzyme which is able to synthesize glucan from sucrose. The presence of glucans promotes selective attachment of oral bacteria that colonize human teeth and has a role in plaque accumulation that can develop into caries. Caries that have reached dentine and roof of pulp chamber need pulp capping treatment using calcium hydroxide. However, calcium hydroxide has a disadvantage, which there is the formation of tunnel defects. Weakness of calcium hydroxide causes many researchers to look for alternative ingredients, one of which uses propolis. Propolis has an active ingredient that can inhibit the enzyme glucosyltransferase. The addition of propolis extract to calcium hydroxide is expected to improve the function of calcium hydroxide. **Purpose:** To determine maximal inhibition of the combination of calcium hydroxide and propolis with a ratio of 1: 1; 1: 1,5; 1: 2 against glucans produced by *Lactobacillus acidophilus*. **Methods:** The study used 4 treatment groups with each group consisting of 6 replications. Group 1 is a combination of calcium hydroxide and propolis with a ratio of 1: 1, group 2 uses a ratio of 1: 1.5, group 3 uses a ratio of 1: 2, and a positive control group uses calcium hydroxide and sterile distilled water. Then into a different tube containing sucrose and phosphate buffer added the solution of *Lactobacillus acidophilus* and each treatment groups. The tube is tilted 300 for 18 hours and then vortexed. The absorbance value of colonization of *Lactobacillus acidophilus* was measured using a spectrophotometer. **Results:** Glucan was measured from the absorbance value of *Lactobacillus acidophilus* colonization. The absorbance value of *Lactobacillus acidophilus* colonization is inversely proportional to the increase in the combination of calcium hydroxide and propolis. Data analysis showed that the results of the study had significant differences between treatment groups. **Conclusion:** The combination of calcium hydroxide and propolis with a ratio of 1: 2 most effectively inhibits glucan formation by *Lactobacillus acidophilus* compared to a combination of calcium hydroxide and propolis with a ratio of 1: 1 and 1: 1.5.

Keywords: Combination of calcium hydroxide and propolis, *Lactobacillus acidophilus*, inhibition, glucan,.

DAYA HAMBAT KOMBINASI KALSIMUM HIDROKSIDA DAN PROPOLIS TERHADAP GLUKAN YANG DIHASILKAN *Lactobacillus acidophilus***ABSTRAK**

Latar belakang: *Lactobacillus acidophilus* merupakan salah satu bakteri penyebab karies dentin. *Lactobacillus acidophilus* memiliki enzim glukosiltransferase yang mampu mensintesis glukukan dari sukrosa. Adanya glukukan mendorong perlekatan selektif bakteri rongga mulut yang berkoloni pada gigi manusia dan mempunyai peranan dalam akumulasi plak yang dapat berkembang menjadi karies. Karies yang telah mencapai dentin dan mencapai atap pulpa perlu dilakukan perawatan *pulp capping* menggunakan kalsium hidroksida. Namun kalsium hidroksida memiliki kelemahan yaitu terbentuknya *tunnel defect*. Kelemahan kalsium hidroksida menyebabkan banyak peneliti mencari bahan alternatif, salah satunya menggunakan propolis. Propolis memiliki bahan aktif yang dapat menghambat enzim glukosiltransferase dalam membentuk glukukan. Penambahan ekstrak propolis pada kalsium hidroksida diharapkan dapat memperbaiki fungsi kalsium hidroksida. **Tujuan:** Untuk menentukan daya hambat maksimal kombinasi kalsium hidroksida dan propolis dengan perbandingan 1:1; 1:1,5 ; 1:2 terhadap glukukan yang dihasilkan *Lactobacillus acidophilus*. **Metode:** Penelitian menggunakan 4 kelompok perlakuan dengan masing-masing kelompok terdiri dari 6 replikasi. Kelompok 1 merupakan kombinasi kalsium hidroksida dan propolis dengan perbandingan 1:1, kelompok 2 menggunakan perbandingan 1:1.5, kelompok 3 menggunakan perbandingan 1:2, dan kelompok kontrol positif menggunakan kalsium hidroksida - akuades steril. Kemudian ke dalam tabung berbeda berisi sukrosa dan buffer fosfat ditambahkan larutan sediaan *Lactobacillus acidophilus* serta masing-masing kelompok perlakuan. Tabung dimiringkan 30⁰ selama 18 jam lalu divortex. Nilai absorbansi kolonisasi *Lactobacillus acidophilus* diukur menggunakan spektrofotometer. **Hasil:** Kadar glukukan diukur dari nilai absorbansi kolonisasi *Lactobacillus acidophilus*. Didapatkan nilai absorbansi kolonisasi *Lactobacillus acidophilus* yang berbanding terbalik dengan peningkatan kombinasi kalsium hidroksida dan propolis. Analisis data menunjukkan bahwa ada perbedaan bermakna antar kelompok perlakuan. **Kesimpulan:** Kombinasi kalsium hidroksida dan propolis dengan perbandingan 1:2 paling efektif menghambat pembentukan glukukan oleh *Lactobacillus acidophilus* dibandingkan kombinasi kalsium hidroksida dan propolis dengan perbandingan 1:1 dan 1:1,5 .

Kata kunci: *Kombinasi kalsium hidroksida dan propolis, Lactobacillus acidophilus, daya hambat, glukukan.*