

ABSTRACT

Alginate impression material can serve as a medium for the transmission of *Streptococcus sanguinis*. Green betel leaf (*Piper betle* L.) contains antibacterial compounds such as flavonoids, tannins, saponins, and essential oils that have the potential to inhibit bacterial growth. This study aimed to determine the effect of green betel leaf infusion concentration as a self-disinfectant during alginate impression material manipulation on the growth inhibition of *S. sanguinis*.

This study was a laboratory experimental research. *Streptococcus sanguinis* was cultured in Brain Heart Infusion Broth and incubated for 24 hours. The infusion was prepared by heating 100 g of green betel leaves and 100 ml of sterile distilled water using indirect heating, then diluted to concentrations of 25% and 50%. Alginate was manipulated using infusion concentrations of 0%, 25%, and 50% with a ratio of 5 g powder and 9 ml infusion, then formed into discs. Alginate discs were placed on Nutrient Agar inoculated with *S. sanguinis* and incubated for 24 hours. Bacterial inhibition was assessed by measuring the diameter of the inhibition zone around the discs in millimeters. Data were analyzed using one-way ANOVA followed by the Games-Howell post-hoc test.

The results showed that green betel leaf infusion exhibited antibacterial activity against *S. sanguinis*, indicated by the formation of inhibition zones at 25% and 50% concentrations. The one-way ANOVA revealed significant differences among groups ($p < 0.05$). The Games-Howell post-hoc test showed that only the 0% and 50% concentrations differed significantly ($p < 0.05$). The results of this study indicate that the concentration of green betel leaf infusion as a self-disinfectant during alginate impression material manipulation influences the enhancement of growth inhibition of *S. sanguinis*.

Keywords: *Piper betle*, green betel leaf infusion, self-disinfectant, alginate, *Streptococcus sanguinis*, antibacterial, inhibition zone

INTISARI

Material cetak alginat dapat menjadi perantara penyebaran *Streptococcus sanguinis* (*S. sanguinis*). Daun sirih hijau (*Piper betle* L.) mengandung senyawa antibakteri seperti flavonoid, tanin, saponin, dan minyak atsiri yang berpotensi menghambat bakteri. Penelitian ini bertujuan mengetahui pengaruh konsentrasi infusa daun sirih hijau sebagai *self-disinfectant* pada manipulasi material cetak alginat terhadap daya hambat pertumbuhan *S. sanguinis*.

Penelitian ini merupakan penelitian eksperimental laboratoris. *Streptococcus sanguinis* dikultur pada media *Brain Heart Infusion Broth* dan diinkubasi 24 jam. Infusa dibuat dengan memanaskan 100 gram (g) daun sirih hijau dan 100 mililiter (ml) akuades steril dengan pemanasan tidak langsung, kemudian diencerkan menjadi konsentrasi 25% dan 50%. Alginat dimanipulasi menggunakan infusa konsentrasi 0%, 25%, dan 50% dengan rasio 5 g bubuk dan 9 ml infusa, kemudian dibentuk cakram. Cakram alginat diletakkan pada media *Nutrient Agar* yang telah diinokulasi *S. sanguinis* dan diinkubasi 24 jam. Daya hambat bakteri dinilai berdasarkan pengukuran diameter zona hambat di sekitar cakram dalam satuan milimeter (mm). Data dianalisis menggunakan uji ANAVA satu jalur, dilanjutkan dengan uji *Post Hoc Games-Howell*.

Hasil penelitian menunjukkan infusa daun sirih hijau memiliki aktivitas antibakteri terhadap *S. sanguinis*, ditandai dengan terbentuknya zona hambat pada konsentrasi 25% dan 50%. Uji ANAVA satu jalur menunjukkan perbedaan bermakna antarkelompok ($p < 0,05$). Uji *Post Hoc Games-Howell* menunjukkan hanya konsentrasi 0% dan 50% yang berbeda signifikan ($p < 0,05$). Kesimpulan penelitian adalah konsentrasi infusa daun sirih hijau sebagai *self-disinfectant* pada manipulasi material cetak alginat berpengaruh dalam memperbesar daya hambat pertumbuhan *S. sanguinis*.

Kata kunci: *Piper betle*, infusa daun sirih hijau, *self-disinfectant*, alginat, *Streptococcus sanguinis*, antibakteri, zona hambat