

INTISARI

Latar belakang: Resistensi antimikroba (AMR) berdampak terhadap tingginya biaya medis dan kematian serta menjadi permasalahan serius di dunia. Peningkatan sifat virulensi *Streptococcus mutans* (kariogenik) menyebabkan bakteri tersebut terlibat dalam munculnya penyakit sistemik. Penggunaan antibakteri saat ini masih dinilai kurang efektif, sehingga perlu eksplorasi antibakteri bahan alam yang potensial. Salah satu bahan alam tersebut yaitu bajakah kalalawit merah (*Uncaria acida* (Hunter) Roch.) yang teridentifikasi memiliki fitokimia antibakteri.

Tujuan Penelitian: Efek antibakteri ekstrak batang dan kulit *U. acida* (Hunter) Roch. terhadap penghambatan pembentukan biofilm, aktivitas enzim *glukosiltransferase* (GTF), integritas membran, dan *asidogenesis S. mutans* ATCC 25175.

Metode: Ekstrak dibuat secara maserasi menggunakan solvent etanol 70% pada suhu ruang. Identifikasi fitokimia secara kualitatif dengan uji Kromatografi Lapis Tipis (KLT). Pengujian antibakteri terhadap penghambatan pembentukan biofilm, aktivitas GTF, integritas membran, dan *asidogenesis S. mutans* ATCC 25175 secara keseluruhan menggunakan metode dilusi cair secara *In vitro* dengan intervensi ekstrak $\frac{1}{2}$ KHM₉₀ 1,07% b/v, 1KHM₉₀ 2,14% b/v, 2KHM₉₀ 4,28% b/v dan kontrol pembanding klorheksidin 0,2%.

Hasil Penelitian: Ekstrak batang dan kulit *U. acida* (Hunter) Roch. memiliki kandungan fitokimia tanin, flavonoid, lakton, eugenol, saponin dan alkaloid. Nilai KHM₉₀ *U. acida* (Hunter) Roch. terhadap *S. mutans* yaitu 2,14% b/v. Hasil pengujian menunjukkan semua perlakuan secara signifikan memiliki aktivitas penghambatan pembentukan biofilm dan aktivitas enzim GTF lebih rendah dibanding klorheksidin ($p < 0,05$), sedangkan intervensi ekstrak rentang 1KHM₉₀-2KHM₉₀ secara signifikan memiliki aktivitas penghambatan dalam mempengaruhi permeabilitas atau destruksi membran dan *asidogenesis* setara atau lebih kuat dibanding klorheksidin ($p < 0,05$).

Kesimpulan: Ekstrak batang dan kulit *U. acida* (Hunter) Roch. mampu menghambat *S. mutans* ATCC 25175 kemungkinan dalam mempengaruhi permeabilitas atau destruksi membran dan penghambatan *asidogenesis* lebih kuat dibanding klorheksidin, sedangkan penghambatan pembentukan biofilm dan enzim *glukosiltransferase* (GTF) lebih lemah dibanding klorheksidin secara *in vitro*.

Kata Kunci: Ekstrak *Uncaria acida* (Hunter) Roch., antibakteri, *Streptococcus mutans*, *in vitro*, dilusi cair

ABSTRACT

Background: Antimicrobial resistance (AMR) has led to high medical costs and deaths, and is a serious problem worldwide. The increased virulence of *Streptococcus mutans* (karyogenic) causes the bacterium to be involved in the emergence of systemic diseases. Antibacterial agents are currently considered less effective; therefore, it is necessary to explore potential natural antibacterial materials. One such natural material is bajakah kalalawit merah (*Uncaria acida* (Hunter) Roch.), which were identified to contain antibacterial phytochemicals.

Objectives: Antibacterial effect of *U. acida* (Hunter) Roch. stem and bark extract against inhibition of biofilm formation, glucosyltransferase (GTF) enzyme activity, membrane integrity, and acidogenesis of *S. mutans* ATCC 25175.

Methods: Extract was macerated using 70% ethanol at room temperature. Qualitative phytochemical identification using thin-layer chromatography (TLC). Antibacterial testing of inhibition of biofilm formation, GTF activity, membrane integrity, and acidogenesis of *S. mutans* as a whole using liquid dilution method in vitro with intervention of 1/2KHM₉₀ extract 1,07% w/v, 1KHM₉₀ 2,14% w/v, 2KHM₉₀ 4,28% w/v, and control of chlorhexidine 0,2%.

Results: *U. acida* (Hunter) Roch. stem and bark extract contains phytochemicals tannins, flavonoids, lactones, eugenol, saponins and alkaloids. Value of KHM₉₀ *U. acida* (Hunter) Roch. against *S. mutans* was 2,14% w/v. The test results showed that all treatments had significantly lower inhibitory activity on biofilm formation and GTF enzyme activity than chlorhexidine ($p < 0,05$), whereas the intervention of extracts in the range of 1KHM₉₀-2KHM₉₀ significantly inhibited membrane permeability or destruction and acidogenesis equivalent to or stronger than chlorhexidine ($p < 0,05$).

Conclusion: *U. acida* (Hunter) Roch. stem and bark extract is able to inhibit *S. mutans* ATCC 25175 possibly in influencing membrane permeability or destruction and inhibition of acidogenesis is stronger than chlorhexidine, while inhibition of biofilm formation and glucosyltransferase (GTF) enzyme is weaker than chlorhexidine in vitro.

Keywords: *Uncaria acida* (Hunter) Roch., antibacterial, *Streptococcus mutans*, in vitro, liquid dilution.