

Chemicals Profile of Kelakai Leaves Extracts (*Stenochlaena palustris*) with Antioxidant and Antibacterial Activity against *Aeromonas hydrophila* (Profil Kimia bagi Ekstrak Daun Kelakai (*Stenochlaena palustris*) dengan Aktiviti Antibakteria dan Antioksidan terhadap *Aeromonas hydrophila*)

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ABSTRACT

Kelakai (*Stenochlaena palustris*) is a typical Kalimantan plant that has been used by Banjar and Dayak communities as traditional medicine and vegetable. This study aimed to examine the potential of kelakai leaves extracts as a natural product to inhibit *Aeromonas hydrophila* growth. This research included kelakai leaves sampling in Banjarbaru, South Kalimantan, Indonesia, extraction (EtOH 1:4 w/v), phytochemical and chemicals profile screening (LCMS), prediction of biological activity (PASS server), antibacterial activity (broth dilution), antioxidant activity (DPPH), total phenol (gallic acid equivalent), total flavonoid (quercetin equivalent), and total alkaloid (caffeine equivalent). The phytochemical screening showed that the kelakai leaves extract contained saponins, tannins, phenolics, flavonoids, alkaloids, anthraquinones, triterpenoids, and steroids. The chemicals profile of the kelakai leaves ethanol extract consisting of alkaloids, alcohols, amines, amine alcohols, amino acids, fatty acids, flavonoids, glycosylglucose, lipid derivatives, monocarboxylic acid, saponins, steroids, and terpenoids. Prediction of biological activity showed kelakai leaves extract an inhibitor of the peptidoglycan glycosyltransferase enzyme and free radical scavenger. The antibacterial assay showed that kelakai leaves extract could inhibit the growth of *A. hydrophila*. In addition, kelakai leaves extract showed very strong antioxidant potential (IC₅₀ 42.47 ± 0.98 µg/mL), with a total phenol content of 193.97 ± 0.11 mg GAE/g, total flavonoid 23.45 ± 0.14 mg QE/g, and total alkaloid 11.74 ± 0.10 mg CE/g. These research findings show that the ethanol extract of kelakai leaves could be antibacterial against *A. hydrophila*, which is closely related to its antioxidant properties.

Keywords: Alkaloids; flavonoids; Kalimantan; peptidoglycan; phenols

ABSTRAK

Kelakai (*Stenochlaena palustris*) adalah tanaman khas Kalimantan yang telah digunakan oleh masyarakat Banjar dan Dayak sebagai ubatan tradisi dan sayur-sayuran. Penyelidikan ini bertujuan untuk mengkaji potensi ekstrak daun kelakai sebagai produk semula jadi untuk menghalang pertumbuhan *Aeromonas hydrophila*. Penyelidikan ini merangkumi pengambilan sampel daun kelakai di Banjarbaru, Kalimantan Selatan, Indonesia, pengekstrakan (EtOH 1:4 w/v), penyaringan profil fitokimia dan bahan kimia (LCMS),

ramalan aktiviti biologi (pelayan PASS), aktiviti antibakteria (pencairan kaldu), aktiviti antioksidan (DPPH) dan total fenol (bersamaan asid galik), total flavonoid (bersamaan kuersetin) dan total alkaloid (bersamaan dengan kafein). Pemeriksaan fitokimia menunjukkan bahawa ekstrak daun kelakai mengandungi saponin, tanin, fenol, flavonoid, alkaloid, antrakuinon, triterpenoid dan steroid. Profil kimia ekstrak etanol daun kelakai terdiri daripada alkaloid, alkohol, amina, alkohol amina, asid amino, asid lemak, flavonoid, glikosilglukosa, terbitan lipid, asid monokarboksilik, saponin, steroid dan terpenoid. Ramalan aktiviti biologi menunjukkan daun kelakai mengekstrak 2532 penghambat enzim peptidoglikan glikosiltransferase dan pemulung radikal bebas. Asai antibakteria menunjukkan bahawa ekstrak daun kelakai dapat merencat pertumbuhan *A. hydrophila*. Selain itu, ekstrak daun kelakai menunjukkan potensi antioksidan yang sangat kuat ($IC_{50} 42.47 \pm 0.98 \mu\text{g/mL}$), dengan jumlah kandungan fenol $193.97 \pm 0.11 \text{ mg GAE/g}$, kandungan flavonoid $23.45 \pm 0.14 \text{ mg QE/g}$ dan kandungan alkaloid $11.74 \pm 0.10 \text{ mg CE/g}$. Penyelidikan ini mendapati bahawa ekstrak etanol daun kelakai dapat menjadi antibakteria terhadap *A. hydrophila*, yang sangat berkaitan dengan sifat antioksidannya.

Kata kunci: Alkaloid; fenol; flavonoid; Kalimantan; peptidoglikan