

PEMETAAN *Staphylococcus aureus* MULTI RESISTEN ANTIBIOTIKA DAN UPAYA PENANGANAN RESISTENSI DENGAN EKSTRAK BIJI ALPUKAT (*Persea americana*, Mill) MELALUI KAJIAN KLINIKO-PATOLOGIS

Abstrak

Staphylococcus aureus merupakan bakteri patogen penting yang menyebabkan mastitis pada ruminansia dan berbagai infeksi pada manusia. Infeksi *S. aureus* pada hewan dan manusia terutama akibat *methicillin resistant S. aureus* (MRSA) merupakan penyakit infeksi yang sulit untuk diatasi karena kuman ini diketahui telah resisten terhadap berbagai antibiotika. Biji buah alpukat (*Persea americana* Mill) merupakan tanaman herbal yang mempunyai banyak potensi dalam mengatasi infeksi bakterial. Tujuan penelitian ini yaitu melakukan isolasi, identifikasi, karakterisasi dan analisis resistensi *S. aureus*, serta analisis potensi ekstrak biji alpukat sebagai antimikroba terutama *S. aureus* resisten multi antibiotika dan efek kliniko patologisnya sebagai suatu upaya mencari alternatif antimikroba baru.

Untuk mencapai tujuan tersebut dilakukan penelitian dengan tahapan sebagai berikut: 1. Isolasi, identifikasi dan karakterisasi *S. aureus* isolat asal manusia, asal susu sapi perah dan kambing Peranakan Ettawah (PE) di wilayah Yogyakarta. 2. Evaluasi resistensi *S. aureus* isolat asal manusia dan hewan terhadap berbagai antibiotika menggunakan metode konvensional dan molekuler. 3. Analisis potensi ekstrak biji alpukat sebagai anti *S. aureus* multi resisten antibiotika. 4. Uji *in-vivo* efektifitas ekstrak biji alpukat untuk mengatasi infeksi *S. aureus* melalui berbagai parameter kliniko-patologik (hematologi dan sitopatologi).

Berdasar identifikasi, karakterisasi fenotipik dan genotipik terdapat 82 *S. aureus*, isolat asal manusia (33 isolat), sapi perah (32 isolat) dan kambing PE (17 isolat). Berdasar hasil uji resistensi isolat *S. aureus* terhadap berbagai antibiotik diketahui bahwa dari 82 isolat *S. aureus* asal manusia, sapi perah dan kambing PE sebesar 38% resisten terhadap Cefoxitin/Oksasilin, Tetracycline (55%), Gentamicin (77%), Ampicillin (74%), Erythromycin (46%) dan sebanyak 23% isolat mempunyai gen *mecA*. Infeksi *S. aureus* pada mencit menyebabkan leukopenia, limfopenia, neutrofilia, monositosis, anemia. Pemberian ekstrak biji alpukat dosis 300 mg/kg BB selama 7 hari setelah infeksi *S. aureus* efektif memperbaiki gambaran darah mencit kembali normal. Berdasarkan hasil pengujian *in vitro* ekstrak biji alpukat mampu menghambat pertumbuhan *S. aureus* multi resisten mulai konsentrasi 13%. Secara *in vivo*, ekstrak biji alpukat mampu menyembuhkan luka infeksi *S. aureus*. Biji buah alpukat berpotensi sebagai obat herbal dalam mengatasi infeksi *S. aureus* yang telah dikonfirmasi resisten terhadap berbagai antibiotika.

Kata kunci: *Persea americana* Mill., *Staphylococcus aureus*, resisten, antibakterial, kliniko-patologik

MAPPING OF MULTI-DRUG RESISTANT *Staphylococcus aureus* AND TREATED THE RESISTANCE WITH AVOCADO SEED EXTRACT (*Persea americana*, Mill.) THROUGH CLINICO-PATHOLOGICAL STUDIES

Abstract

Staphylococcus aureus is an important pathogenic bacterium that causes mastitis in ruminants and various infections in humans. *S. aureus* infection in animals and humans, especially due to methicillin resistant *S. aureus* (MRSA) is an infectious disease that is difficult to treat because this bacterium is known to be resistant to various antibiotics. Avocado seeds (*Persea americana* Mill) are herbal plants that have a lot of potential in overcoming bacterial infections. The phytochemical components of avocado seeds consist of alkaloids, flavonoids, tannins, and saponins, which have potential as antibacterial. The purpose of this study was to isolation, identify, characterize and analyze *S. aureus* resistance as well as analyze the potential of avocado seed extract as an antimicrobial, especially multi-antibiotic resistant *S. aureus* and its clinical pathological effects, which is an attempt to find new antimicrobial alternatives.

To achieve this goal, it is necessary to conduct research with the following stages: 1. Isolation, identification and characterization of *S. aureus* isolates from human origin, milk from dairy cows and Ettawah Peranakan goats (PE) in the Yogyakarta area. 2. Evaluation of the resistance of *S. aureus* isolates from humans and animals to various antibiotics using conventional and molecular methods. 3. Analysis of the potency of avocado seed extract as anti-antibiotic resistant *S. aureus*. 4. In-vivo test of the effectiveness of avocado seed extracts to treat *S. aureus* infection through various clinico-pathological parameters (hematology, cytopathology, pathology).

Based on identification, phenotypic and genotypic characterization, there were 82 *S. aureus*, isolates of human origin (33 isolates), dairy cattle (32 isolates) and goats (17 isolates). Based on the results of the resistance test of *S. aureus* isolates to various antibiotics, it was found that 38% of the 82 isolates of *S. aureus* from humans, cattle and goats were resistant to Cefoxitin/Oxacillin (38%), Tetracycline (55%), Gentamicin (77%), Ampicillin (74%), Erythromycin (46%) and as many as 23% isolates had the *mecA* gene. *S. aureus* infection in mice causes leukopenia, lymphopenia, neutrophilia, monocytosis, anemia. The administration of avocado seed extracts dose of 300 mg/kg BW for 7 days after *S. aureus* infection was effective in improving the blood profile of mice back to normal. Based on the results of in vitro testing, avocado seed extract was able to inhibit the growth of multi-resistant *S. aureus* from a concentration of 13%. In vivo, avocado seed extract is able to heal wounds infected with *S. aureus*. Avocado seeds have potential as herbal medicine to treat *S. aureus* infection which has been confirmed to be resistant to various antibiotics.

Keywords: *Persea americana* Mill., *Staphylococcus aureus*, resistant, antibacterial, clinico-pathologic

