



BUKU REFERENSI

TINJAUAN BIOLOGI MOLEKULER
ACHRAS ZAPOTA L
TERHADAP SALMONELLA TYPHI

Hasta Handayani Idrus | Ratih Rinendyaputri | Fitriana

Tentang Penulis



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KATA PENGANTAR

Puji syukur saya panjatkan kepada Tuhan Yang Maha Esa, karena atas berkat dan rahmat-Nya, saya dapat menyelesaikan buku ini. Penulisan buku merupakan buah karya dari pemikiran penulis yang diberi judul “Tinjauan Biologi Molekuler *Achras Zapota L* terhadap *Salmonella typhi*”. Saya menyadari bahwa tanpa bantuan dan bimbingan dari berbagai pihak sangatlah sulit bagi saya untuk menyelesaikan karya ini. Oleh karena itu, saya mengucapkan banyak terima kasih pada semua pihak yang telah membantu penyusunan buku ini. Sehingga buku ini bisa hadir di hadapan pembaca.

Buku ini mencoba membahas Efek Ekstrak Buah Sawo Manila (*Achras zapota L*) Terhadap Ekspresi Gen mRNA *High Motility Group Box 1 (HMGB1)* Dan Solubel *Tumor Necrosis Factor Alpha (TNF- α)* Pada Mencit Yang Terinfeksi *Salmonella typhi*. Sawo manila telah lama digunakan oleh masyarakat Indonesia sebagai pengobatan alternative dari penyakit demam tifoid, dengan cara memarut buahnya dan memeras air yang terkandung didalamnya dengan menggunakan kain halus. Pengobatan ini terbukti efektif dalam menyembuhkan pasien demam tifoid. Selain itu banyaknya kasus resistensi terhadap antibiotik dalam kasus demam tifoid.

Penulis menyadari bahwa buku ini masih jauh dari kesempurnaan. Oleh karena itu kritik dan saran yang membangun sangat dibutuhkan guna penyempurnaan buku ini. Akhir kata saya berharap Tuhan Yang Maha Esa berkenan membalas segala kebaikan semua pihak yang telah membantu. Semoga buku ini akan membawa manfaat bagi pengembangan ilmu pengetahuan.

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BAB

1

PENDAHULUAN

Sawo manila atau lebih dikenal dengan nama latin *Sapodilla (Achras zapota L)* Van Royen adalah tumbuhan yang berasal dari Amerika Tengah, Mexico dan Hindia Barat (Peiris, 2014). Di Indonesia tanaman ini dikenal dengan nama Sawo Kecil oleh orang Jawa dan Punrulu oleh orang bugis Sulawesi selatan. Tanaman ini dapat tumbuh di berbagai dataran baik dataran rendah maupun dataran tinggi dan sudah tersebar di seluruh Indonesia (Mukhriani et al., 2014). Tanaman ini adalah tanaman yang tumbuh di daerah tropis dan dapat berbuah sepanjang tahun akan tetapi panen buah terbesar terjadi pada bulan Desember. Sawo Manila sangat berpotensi untuk dibudidayakan karena pemeliharannya sangatlah mudah (Subakir, 2019).

Sawo manila (*Achras zapota L*) adalah pohon buah yang dapat berbuah sepanjang tahun. Sawo manila memiliki pohon yang besar dan rindang, dapat tumbuh hingga setinggi 30-40 m. Bunga tunggal terletak di ketiak daun dekat ujung ranting, bertangkai 1-2 cm, kerap kali menggantung, diameter bunga s/d 1,5 cm, sisi luarnya berbulu kecoklatan, berbilangan 6. Kelopak biasanya tersusun dalam dua lingkaran; mahkota bentuk genta, putih, berbagi sampai setengah panjang tabung. Daun tunggal, terletak berseling, sering mengumpul pada ujung ranting. Helai daun bertepi rata, sedikit berbulu, hijau tua mengkilap, bentuk bulat-telur jorong sampai agak lanset, 1,5-7 x 3,5-15 cm, pangkal dan ujungnya bentuk baji, bertangkai 1-3,5 cm, tulang daun utama menonjol di sisi sebelah bawah. Bercabang rendah, batang sawo manila berkulit kasar abu-

BAB

2

SAWO MANILA (*Achras zapota* L.)

A. Karakteristik Sawo Manila (*Achras zapota* L)

Sawo manila (*Achras zapota* L) adalah pohon buah yang dapat berbuah sepanjang tahun. Sawo manila memiliki pohon yang besar dan rindang, dapat tumbuh hingga setinggi 30-40 m. Nama lain sawo manila adalah *Manikara zapota* L, nama daerahnya adalah *West-Indische mispel*, *Nefle d' Amerique*, *Sapotiller*, *Sapotillbaum*, *Neesberry*, *Sapodilla-Ind*, *Ciku-Sund*, *sawo londa*, *sabu manila*, *sabo jawa*. Berasal dari Amerika tropic, di jawa umum di budidayakan di daerah dataran rendah; pembiakan dilakukan dengan cangkokan atau dengan biji (Bano et al., 2017).

Buahnya yang manis dapat diperoleh setahun penuh, orang mengenalnya dengan bentuk elipsoidis dan berbentuk kira-kira seperti buah apel maka sering disebut juga sawo apel. Buah sawo manila yang baik dapat diperoleh didaerah Jakarta dipasar minggu dan daerah sekitarnya. Beratnya sangat berbeda dari buah yang besar dan baik berat kulitnya 25 gram, dan buahnya 150 gram dan berat biji sekitar 1 gram. Dalam satu buah sawo manila terdapat kandungan 30% tannin, 30% triterpenoid, 30% flavonoid, dan 10% air (Deshmukh et al., 2015)

BAB 3 | TUMOR NECROSIS FACTOR ALPHA (TNF- α)

A. Pengertian Tumor Necrosis Factor Alpha (TNF- α)

Tumor necrosis factor alpha (TNF- α) adalah salah satu sitokin pleiotropik yang berperan dalam proses inflamasi, menginisiasi polymorphonuclear (PMN) dan mengaktifkannya sehingga PMN dapat mencapai tempat infeksi. Tumor necrosis factor alpha (TNF- α) merupakan sitokin utama pada respon inflamasi akut terhadap bakteri Gram negatif dan mikroba lainnya (Marusic et al., 2012).

Infeksi yang berat dapat memicu produksi TNF- α dalam jumlah besar yang menimbulkan reaksi sistemik. Sumber utama TNF- α ialah fagosit mononuklear dan sel T yang diaktifkan antigen, sel NK, dan sel mast. Lipopolisakarida merupakan rangsangan paten terhadap makrofag untuk menyekresi TNF- α . IFN- γ yang diproduksi sel T dan sel NK juga merangsang makrofag antara lain meningkatkan sintesis TNF- α (Q. Yang et al., 2013). TNF- α mempunyai beberapa fungsi dalam proses inflamasi, yaitu dapat meningkatkan peran pro trombotik dan merangsang molekul adhesi dari sel leukosit serta menginduksi sel endotel, berperan dalam mengatur aktivitas makrofag dan respon imun dalam jaringan dengan merangsang faktor pertumbuhan dan sitokin lain, berfungsi sebagai regulator dari hematopoetik serta komitogen untuk sel T dan sel B serta aktivitas sel neutrophil dan makrofag (Lee et al., 2015).

BAB

4

SALMONELLA TYPHI

A. Pengertian *Salmonella typhi*

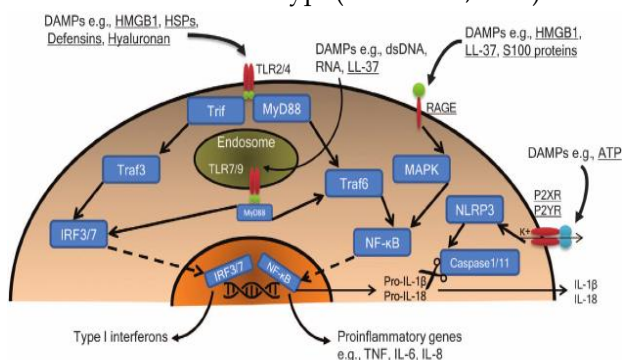
Salmonella typhi merupakan bakteri penyebab salmonellosis yang merupakan salah satu penyakit edemis dan menimbulkan kerugian yang serius terutama di Negara berkembang termasuk Indonesia. Bakteri salmonella ditularkan melalui makanan dan minuman yang terkontaminasi kotoran atau tinja dari seorang penderita tifoid (Ramachandran et al., 2016). Bakteri masuk melalui mulut bersama makanan dan minuman, kemudian berlanjut ke saluran pencernaan. Jika bakteri yang masuk dengan jumlah yang banyak maka bakteri akan masuk ke dalam usus halus selanjutnya masuk ke dalam sistem peredaran darah sehingga menyebabkan bakteremia, demam tifoid, dan komplikasi organ lain (Xinxin et al., 2017).

Salmonella merupakan bakteri Gram negatif berbentuk batang bergerak yang khas memfermentasikan glukosa dan manosa tanpa membentuk gas tetapi tidak memfermentasikan laktosa dan sukrosa. *Salmonella* menghasilkan H₂S (Wilson et al., 2014). Isolat salmonella pada media SSA pada suhu 37°C maka koloni akan tampak cembung, transparan, bercak hitam dibagian pusat. Bakteri salmonella akan mati pada suhu 60°C selama 15 - 20 menit melalui pasteurisasi, pendidihan dan klorinasi (Sharma et al., 2017).

BAB 5 | HMGB1 (HIGH MOTILITY GROUP BOX 1)

A. Pengertian High Motility Group Box 1 (HMGB1)

High Motility Group Box 1 (HMGB1) adalah protein yang diekspresikan secara konstitutif di hampir semua jenis sel. Sebagai tanggapan terhadap infeksi mikroba, HMGB1 disekresikan dari sel kekebalan yang diaktivasi untuk mengatur peradangan. Di sini kita meninjau mekanisme yang berbeda dimana beberapa komponen herbal menghambat aksi atau sekresi HMGB1 seperti dengan memodulasi aktivasi inflamasi, autophagic degradation, atau endocytic serapan. Mengingat interaksi timbal balik Antara proses seluler ini, kita dapat mengembangkan terapi herbal yang efektif untuk pengelolaan klinis penyakit inflamasi salah satunya demam typhoid yang disebabkan oleh salmonella thypi (Reed et al., 2016).



Gambar 5.1 HMGB1 dalam inflamasi bakteri (Reed et al., 2016)

BAB

6

DEMAM TIFOID

A. Pengertian Demam tifoid

Demam tifoid akut merupakan penyakit infeksi akut bersifat sistemik yang disebabkan oleh mikroorganisme *Salmonella enterica* serotipe *typhi* yang dikenal dengan *Salmonella typhi*. Penyakit ini masih sering dijumpai di negara berkembang yang terletak di subtropis dan daerah tropis seperti Indonesia (Sidabutar et al., 2010).

Penyakit demam tifoid (typhoid fever) yang biasa disebut tifus merupakan penyakit menyerang bagian saluran pencernaan. Selama terjadi infeksi, kuman tersebut bermultiplikasi dalam sel fagositik mononuklear dan secara berkelanjutan dilepaskan ke aliran darah. Demam tifoid termasuk penyakit menular yang tercantum dalam Undang-undang nomor 6 Tahun 1962 tentang wabah (Sidabutar et al., 2010). Kelompok penyakit menular ini merupakan penyakit yang mudah menular dan dapat menyerang banyak orang sehingga dapat menimbulkan wabah. Demam tifoid dikenal juga dengan sebutan typhus abdominalis, typhoid fever, atau enteric fever. Istilah tifoid ini berasal dari bahasa Yunani yaitu typhos yang berarti kabut, karena umumnya penderita sering disertai gangguan kesadaran dari yang ringan sampai yang berat (Paul et al., 2017).

Demam tifoid adalah infeksi bakteri yang disebabkan oleh bakteri *Salmonella typhi*. Ini terutama menyebar melalui makanan dan air yang terkontaminasi atau kontak langsung

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TENTANG PENULIS



Hasta Handayani Idrus, Lahir di Sidrap pada 2 mei 1988. Saat ini penulis bekerja sebagai Peneliti di Pusat Riset Biomedis, Badan Riset dan Inovasi Nasional Indonesia dan juga Dosen Mikrobiologi Fakultas Kedokteran Universitas Muslim Indonesia. Ahli dalam penelitian di bidang Infeksi Bakteri, Virus dan Jamur serta pengobatan tanaman herbal yang dapat menjadi pengganti antibiotik di masa depan.

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Penghargaan yang diterima :

1. (*BEST PAPER) Online International Conference on Chemical, Biological, and Medical Sciences (ICCBMS21)"
2. (*BEST PRESENTATION) The 2nd International Conference on Halal Issue, Policy, and Sustainability
3. (*BEST PAPER) "International Conference on Biomedical Science (ICBMS19)"
4. (*BEST PRESENTATION) the 3rd International Conference on Halal, Policy, Culture and Sustainability Issues (IC-HalalUMI2021)
5. Best Speaker "2 Inspiring International Research Excellence"