

Potensi Ekstrak *Atuna racemosa* sebagai Anti – *Methicillin Resistant Staphylococcus aureus* (MRSA) dan Imunostimulator Sistem Imun Seluler

Intisari
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Seiring dengan peningkatan kejadian infeksi dan resistensi terhadap MRSA, perlu dicari alternatif pengobatan lain. Penelitian ini bertujuan mengetahui potensi ekstrak *Atuna racemosa* sebagai anti MRSA dan sebagai imunostimulator sistem imun seluler. Uji potensi *Atuna racemosa* terhadap MRSA dilakukan dengan metode *Disk Agar diffusion* dan *Agar Dilution* terhadap *S. aureus* dengan perlakuan ekstrak *Atuna racemosa* konsentrasi 1%, 3%, 5%, 7%, 10%, 12%, 15%, sebagai kontrol *disc* tetracyclin 30 µg. Potensi *Atuna racemosa* diamati setelah inkubasi selama 18-24 jam pada 37°C. Pengamatan kerusakan dinding bakteri dilakukan dengan SEM. Respon imun seluler dilakukan melalui uji fagositosis makrofag *in vivo* digunakan 15 ekor mencit, strain *Balb-C*, dibagi menjadi 5 kelompok. K1 sebagai placebo. K2, K3, K4 dan K5, mencit diinfeksi dengan suspensi MRSA (1×10^8 bakteri/ml) secara intraperitoneal (IP), pada hari kedua K3 diberi tetracyclin, K4 diberi larutan ekstrak *Atuna racemosa* 1%, mencit K5 diberi larutan ekstrak *Atuna racemosa* 5% secara per oral selama 5 hari. Mencit dieuthanasi, untuk koleksi sel-sel makrofag peritoneal. Hasil uji potensi antibakterial dengan agar difusi menunjukkan ekstrak *Atuna racemosa* konsentrasi $\geq 5\%$ memiliki aktivitas antibakteri besar atau termasuk sensitif (zona $>10\text{mm}$). Hasil uji agar dilusi diketahui bahwa pada konsentrasi ekstrak *Atuna racemosa* 3 mg/ml tidak terdapat pertumbuhan MRSA pada permukaan agar. Gambaran hasil SEM menunjukkan bahwa sel bakteri yang dipaparkan oleh ekstrak *Atuna racemosa* konsentrasi 1%, 5% dan 15% yang ditambahkan 1ml suspensi bakteri MRSA (1×10^8 bakteri) mengalami kerusakan morfologi bentuk sel, yaitu sel tampak terjadi pengkerutan, dan permukaan membran sel tidak rata, sel tidak utuh bulat. Jumlah rata-rata bakteri yang difagosit oleh sel makrofag K1 (12,60 bakteri/sel), K2 (10,40 bakteri/sel), K3 (11,85 bakteri/sel), K4 (17,65 bakteri/sel), K5 (20 bakteri/sel), jumlah bakteri yang terfagosit paling banyak pada perlakuan dengan ekstrak *Atuna racemosa* 5%. Berdasarkan data tersebut, pemberian ekstrak *Atuna racemosa* terhadap hewan yang terinfeksi MRSA, mampu meningkatkan imunitas seluler dengan peningkatan kemampuan sel makrofag dalam memfagosit MRSA.

Katakunci : MRSA, *Atuna racemosa*, Antibakterial, Imunostimulator.

The Potency of *Atuna racemosa* extract as Anti - *Methicillin Resistant Staphylococcus aureus* (MRSA) and Cellular Immune System immunostimulant

Abstract

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Along with the increasing incidence of infection and resistance to MRSA, a new alternative treatment is an urgency. This study aims to determine the potency of *Atuna racemosa* extract as an anti MRSA and as an immunostimulant of cellular immune system. The potency test of *Atuna racemosa* extract against MRSA was performed by *diffusion disc agar and dilussion agar* was used as base which had been inoculated with *S. aureus* by concentration of *Atuna racemosa* extract used were 1%, 3%, 5%, 7%, 10%, 12%, 15 %. conducted by using tetracycline 30 µg disc After inoculation, MRSA growth was observed after incubation for 18 - 24 hours at 37°C. Cell wall damaged observation was conducted using SEM. Cellular immune response was conducted *in vivo* by macrophage phagocytosis test using 15 male mice, strain *Balb-C*, Mice were grouped into 5 group. K1 as the negative control (placebo), K2, K3, K4, and K5 group, mice were infected with MRSA suspension (10^8 /ml) intraperitoneal route. Then on 2nd day K3 were given tetracycline, K4 were treated with dosage extract of *Atuna racemosa* 1%, while K5 with dosage extract of *Atuna racemosa* 5% orally for 5 days. Mice then were euthanized to collect the peritoneal macrophage cell. The results of antibacterial effect test by *diffusion agar* showed that extract of *Atuna racemosa* with concentration >5% had antibacterial activity effect/sensitive (>10 mm). In dilution agar test, it was showed that there was no MRSA growth in 3 mg/ml *Atuna racemosa* extract with concentration. Results of SEM showed that bacteria had broken cell when treated with 1%, 5%, and 15% of *Atuna racemosa* extract added 1ml MRSA bacterial suspensions (1×10^8 bacteria) such as shrinkage cell, uneven cell membrane, and incomplete cell. The average number bacteria that was phagocyte by the macrophage was K1 (12.60 bacteria/cell), K2 (10.40 bacteria/cell), K3 (11.85 bacteria/cell), K4 (17.65 bacteria/cell), K5 (20 bacteria/cell). The 5% extract of *Atuna racemosa* showed the most phagocyte activity. Based on these results, the treatment of *Atuna racemosa* extract for MRSA-infected animals will able to enhance cellular immunity with increased ability of macrophage cells to phagocyte MRSA.

Keywords: MRSA, *Atuna racemosa*, Antibacterial, Immunostimulatory.