

RESISTENSI *METHICILLIN RESISTANT Staphylococcus aureus* (MRSA) ISOLAT ASAL AYAM TERHADAP SISTEM IMUN SELULER HOSPEL MELALUI UJI FAGOSITOSIS LEUKOSIT POLIMORFONUKLEAR DAN SEL-SEL MAKROFAG

INTISARI

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Infeksi *Methicillin Resistant Staphylococcus aureus* (MRSA) merupakan salah satu infeksi penyebab zoonosis yang mempunyai peran penting dalam dunia kesehatan hewan dan manusia. Infeksi MRSA sulit untuk dikendalikan karena strain ini sudah resisten terhadap berbagai macam antibiotika. Penelitian ini bertujuan untuk mengetahui kemampuan fagositosis leukosit polimorfonuklear dan makrofag terhadap MRSA isolat asal ayam melalui peran opsonisasi secara *in vitro*.

Dalam penelitian ini digunakan isolat *Staphylococcus aureus* asal ayam yang mengalami artritis, *bumble foot* dan *swollen head* yang diidentifikasi secara fenotipik dan genotipik. Uji resistensi *Staphylococcus aureus* terhadap berbagai antibiotika dilakukan melalui uji *diffusion*. Konfirmasi resistensi *Staphylococcus aureus* terhadap *methicillin* dilakukan dengan deteksi gen *mecA* melalui metode *Polymerase Chain Reaction* (PCR). Kemampuan MRSA dalam menghindari sistem pertahanan seluler tubuh, dilakukan melalui uji fagositosis menggunakan leukosit polimorfonuklear (PMN) dan sel makrofag mencit secara *in vitro*. Aktivitas fagositosis ditentukan dengan cara menghitung jumlah bakteri yang difagosit oleh setiap sel makrofag dan sel PMN.

Hasil uji fenotipik dan genotipik dapat teridentifikasi 11 isolat asal ayam pedaging positif *Staphylococcus aureus*. Berdasar keberadaan gen yang bertanggung jawab terhadap resistensi *methicillin* (gen *mecA*), terdapat 3 isolat termasuk dalam strain MRSA dan 8 isolat strain *Methicillin Sensitive Staphylococcus aureus* (MSSA). Jumlah rata-rata bakteri yang difagosit sel-sel PMN dengan perlakuan opsonisasi terhadap isolat MSSA (28,00 bakteri/sel), MRSA (27,44 bakteri/sel) dan jumlah rata-rata bakteri yang difagosit oleh PMN tanpa opsonisasi terhadap MSSA (21,09 bakteri/sel), MRSA (20,78 bakteri/sel). Jumlah rata-rata bakteri yang difagosit oleh sel makrofag dengan opsonisasi terhadap MSSA (26,06 bakteri/sel), MRSA (25,45 bakteri/sel) fagositosis sel makrofag tanpa opsonisasi terhadap MSSA (19,01 bakteri/sel), MRSA (16,37 bakteri/sel). Jumlah rata-rata MSSA yang difagosit oleh PMN dan sel makrofag menunjukkan angka lebih tinggi dibanding MRSA baik dengan opsonisasi maupun tanpa opsonisasi ($p < 0,05$). Dari hasil tersebut menunjukkan bahwa MRSA mempunyai potensi dalam menghindari sistem imun seluler. Aktivitas fagositosis PMN dan sel makrofag terhadap MRSA dapat ditingkatkan dengan mediator serum sebagai opsonin.

Kata Kunci: *Staphylococcus aureus*, methicillin, resisten, leukosit polimorfonuklear, makrofag

**RESISTANCE OF *METHICILLIN RESISTANT Staphylococcus aureus* (MRSA)
ISOLATED FROM CHICKENS AGAINST HOST CELLULAR IMMUNE
SYSTEM BY PHAGOCYTOSIS OF POLYMORPHONUCLEAR
LEUKOCYTES AND MACROPHAGE CELLS**

ABSTRACT

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Methicillin Resistant Staphylococcus aureus (MRSA) infection is one of the causative agent of zoonosis infection that have significant roles in human and animal health. It is difficult to control MRSA infections because the strain has been resistant to variety of antibiotics. This research aimed to evaluate the ability of phagocytose of polymorphonuclear leukocytes and macrophage cells against MRSA isolated from broiler by in vitro opsonization.

Staphylococcus aureus isolates used in this study were isolated from arthritis, bumble foot and swollen head cases of broiler and identified phenotypic- and genotypically. Susceptibility assay of *Staphylococcus aureus* against various antibiotics has been done by the diffusion method. Identification of MRSA were confirmed by detection of *mecA* gene using *Polymerase Chain Reaction* (PCR) method. The ability of MRSA to avoid cellular immune system were conducted by phagocytose of polymorphonuclear leukocytes and macrophage cells derived from peritoneal of mice in vitro. The activities of phagocytose were determined by counting of bacteria in PMN and macrophage cells.

According to the phenotypic and genotypic properties could be identified 11 isolates of *Staphylococcus aureus*. Based on the existence of resistance methicillin genes (*mecA*), there were 3 isolates including MRSA strains and 8 isolates methicillin sensitive *Staphylococcus aureus* (MSSA) strains. The mean number of bacteria that phagocytosed by PMN with opsonization treatment could be counted MSSA (28.00 bacteria/cells) and MRSA (27.44 bacteria/cells), the otherwise for untreated opsonization revealed the number of MSSA (21.09 bacteria/cells) and MRSA (20.78 bacteria/cells). The mean number of bacteria that phagocytosed by macrophage cells with opsonization could be determined for MSSA (26.06 bacteria/cells) and MRSA (25.45 bacteria/cells), and without opsonization revealed MSSA (19.01 bacteria/cells) and MRSA (16.37 bacteria/cells). The phagocytose index of PMN and macrophage cells against MSSA strains were higher than MRSA, both opsonization or without opsonization ($p < 0.05$). These results showed that MRSA strains have potential factors to avoid cellular immune system. The activity of phagocytose of PMN and macrophage cells against MRSA can be improved by mediator of serum opsonization.

Key Words: *Staphylococcus aureus*, methicillin, resistant, leukocyte polymorphonuclear, macrophage