

Occurrence of Methicillin-Resistant *Staphylococcus Aureus* in Raw Shellfish at Retail Markets in Malaysia and Antibacterial Efficacies of Black Seed (*Nigella sativa*) Oil against MRSA

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Abstract: Methicillin-resistant *Staphylococcus aureus* (MRSA) is a remarkable pathogen which causes nosocomial diseases worldwide. In this study, raw green mussel and cockle samples in Malaysia were collected and investigated for the occurrence of MRSA. A total of 80 samples were analyzed using phenotypic and molecular approaches. A assembling of the most probable number (MPN) with multiplex polymerase chain reaction (mPCR) technique was used to identify MRSA in the samples. The occurrences of *S. aureus* and MRSA in shellfish samples were 15% and 8.75%, respectively, with the microbial load from <3 to 12.2 MPN/g. MRSA isolates were tested for their sensitivity to 17 generally used antibiotic agents by using disc diffusion assay. All the isolates were resistant to amikacin and penicillin. However, sensitivity was recorded for cefoxitin, ceftaroline, chloramphenicol, ciprofloxacin, clarithromycin levofloxacin, linezolid, ofloxacin, quinupristin/dalfopristin, tetracycline and trimethoprim-sulfamethoxazole. Moreover, the antimicrobial activities against MRSA were evaluated using minimum inhibited concentration (MIC) and minimum bactericidal concentration (MBC). The findings revealed that the black seed oil acted as a potent inhibitor of MRSA. The lowest value of MIC and MBC of black seed oil against MRSA was 32.8 and 42.2 mg/mL, respectively. The detection of MRSA in this study deserves a public attention because shellfish are commonly eaten raw or partially cooked in Malaysia.

Keywords:

Methicillin-resistant, *staphylococcus aureus*, MPN- PCR, Shellfish Antimicrobial susceptibility, black seed oil.

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