

DETECTION OF SELECTED RESISTANCE GENES, INTEGRONS,
SALMONELLA GENOMIC ISLANDS AND PLASMIDS IN
MULTIDRUG RESISTANT SALMONELLA

LEE KONG HOE

FACULTY OF SCIENCE
UNIVERSITY OF MALAYA
KUALA LUMPUR

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LEE KONG HOE

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**INSTITUTE OF BIOLOGICAL SCIENCES
FACULTY OF SCIENCE
UNIVERSITY OF MALAYA
KUALA LUMPUR**

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ABSTRACT

The study was to detect and characterize the selected antimicrobial resistance genes, class 1 integron, *Salmonella* Genomic Island 1 (SGI1) and plasmid profile of 41 selected multidrug resistant (MDR) *Salmonella* strains of human origin. *Salmonella* strains harbored *bla*_{CTX-M} (33.3%) followed by *bla*_{TEM} (25.0%), *bla*_{PSE-1} (13.9%), *bla*_{CMY-2} (8.3%) and *bla*_{SHV} (2.8%) genes. Quinolone or fluoroquinolone-resistant strains harbored *qnrB* (75.0%) and *qnrS* (29.2%) genes. Concurrent presence of β -lactamase genes and *qnr* genes were detected in 9 strains, including *S. Lagos* (n=1), *S. Enteritidis* (n=2), *S. Farsta* (n=2) and *S. Typhimurium* (n=4). Class 1 integron was detected in 9 strains (*S. Albany* (n=2), *S. Corvallis* (n=1), *S. Typhimurium* (n=1), *S. Paratyphi B var Java* (n=3), *S. Limete* (n=1), *S. Bovismorbificans* (n=1)) and five different gene cassettes, namely *aadA2*, *dfrA1-catB3*, *bla*_{PSE-1}, *dfrA1-orfC*, and *dfrA12-aadA2* were found. Besides, SGI1 was also detected in six class 1 integron-positive strains, including *S. Albany* (n=2), *S. Paratyphi B var Java* (n=3), and *S. Limete* (n=1). To our knowledge, this is the first study reporting on the detection of class 1 integron and SGI1 in *S. Limete*. Furthermore, 23 plasmid profiles were identified in 30 MDR *Salmonella* strains and the plasmids ranged from 1.8kb to 65.0kb. Six and nine plasmid-positive strains harbored only β -lactamase gene(s) or *qnr* gene(s), respectively; while, nine plasmid-positive strains harbored both β -lactamase gene and *qnr* gene. In conclusion, concurrent resistant to extended spectrum cephalosporins (ESCs) and fluoroquinolones were observed and this phenomenon needs to be concerned because it will limit the therapeutic options for severe *Salmonella* infections.

ABSTRAK

Kajian ini dilakukan untuk menyiasat kewujudan gen penentangan terhadap antibiotik, integron kelas satu, *Salmonella* pulau genomic 1 (SGI1) dan profil plasmid antara 41 MDR strain *Salmonella* terpilih daripada asal manusia. Strain *Salmonella* memiliki gen *bla*_{CTX-M} (33.3%), diikuti oleh *bla*_{TEM} (25.0%), *bla*_{PSE-1} (13.9%), *bla*_{CMY-2} (8.3%), dan *bla*_{SHV} (2.8%). Strain menentang terhadap kuinolon atau fluorokuinolon memiliki gen *qnrB* (75.0%) dan *qnrS* (29.2%). Kehadiran kedua-dua gen β -laktamase dan gen *qnr* dapat dikesan dalam sembilan strain, termasuk *S. Lagos* (n=1), *S. Enteritidis* (n=2), *S. Farsta* (n=2) and *S. Typhimurium* (n=4). Integron kelas satu dapat dikesan dalam sembilan strain (*S. Albany* (n=2), *S. Corvallis* (n=1), *S. Typhimurium* (n=1), *S. Paratyphi B* var Java (n=3), *S. Limete* (n=1), *S. Bovismorbificans* (n=1) di mana lima kaset gen yang berlainan dijumpai, iaitu *aadA2*, *dfrA1-catB3*, *bla*_{PSE-1}, *dfrA1-orfC*, and *dfrA12-aadA2*. Di samping itu, SGI dijumpai dalam enam strain yang memiliki integron kelas satu termasuk *S. Albany* (n=2), *S. Paratyphi B* var Java (n=3), and *S. Limete* (n=1). Satu penemuan yang menarik dijumpai dalam kajian ini bahawa integron kelas satu dan SGI 1 dijumpai dalam *S. Limete*, di mana penemuan ini tidak pernah dilaporkan dalam kajian-kajian lain. Seterusnya, 23 profil plasmid dikenalpasti dalam 30 MDR strain dan saiz plasmid adalah dalam lingkungan antara 1.8kb hingga 65.0kb. Enam dan sembilan strain yang memiliki plasmid juga memiliki gen β -laktamase atau gen *qnr* sahaja, masing-masing. Sementara itu, sembilan strain yang memiliki plasmid juga memiliki kedua-dua gen β -laktamase dan gen *qnr*. Jadi, penentangan terhadap kedua-dua sefalosporin spectrum diperpanjang dan fluorokuinolon perlu diberi perhatian kerana fenomena ini akan menyekat pilihan terapi untuk jangkitan *Salmonella* yang serius.

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