INTISARI
KAJIAN DETEKSI DAN RESISTANSI ANTIBIOTIK PADA *Salmonella spp.* YANG DIISOLASI DARI ANJING, KUCING, DAN REPTIL YANG DIIMPOR MELALUI BANDAR UDARA SOEKARNO HATTA

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Salmonella spp. merupakan bakteri yang bersifat zoonosis dan penting bagi hewan serta manusia. Beberapa isolat *Salmonella spp.* diketahui telah mengalami resistansi terhadap antibiotik. Resistansi antibiotik merupakan ancaman global bagi kesehatan masyarakat dan kesehatan hewan termasuk hewan kesayangan seperti anjing, kucing, dan reptil. Tujuan penelitian ini untuk mendeteksi *Salmonella spp.* dari anjing, kucing, dan reptil yang diimpor dan mengidentifikasi kekerabatan genetik, resistansi terhadap antibiotik, serta gen penyandi resistansinya. Sampel yang digunakan pada penelitian ini berupa swab rektal yang berasal dari 26 ekor anjing dan 33 ekor kucing serta swab kloaka reptil yang terdiri dari 12 ekor kura-kura dan 52 ekor ular. Isolasi dan identifikasi menggunakan media *Xylose Lysine Deoxycholate* (XLD), *Triple Sugar Iron Agar* (TSIA), dan *Lysine Indol Agar* (LIA), dan Media *Indole, Methyl Red, Voges-Proskauer,Citrate (*IMVic). Pengujian resistansi menggunakan metode *Kirby Bauer*. Deteksi gen virulensi menggunakan metode *Polymerase Chain Reaction (PCR)* dengan target gen *invA* dan gen resistan dengan target gen *bla$_{TEM}$, tetA, strA, sul2, qnrS,* dan *cmlA*. Hasil sekuensing diolah menggunakan *BLAST*. Analisis filogenetik menggunakan *software* MEGA11. Data dianalisis secara deskriptif. *Salmonella spp.* ditemukan pada 51 dari 123 (41,46%) sampel hewan kesayangan yang diimpor. Isolat *Salmonella spp.* tersebut berasal dari 2 ekor kucing, 5 ekor kura-kura, dan 44 ekor ular, tetapi tidak ditemukan isolat yang berasal dari anjing. Seluruh isolat *Salmonella spp.* yang ditemukan bersifat invasif (mengandung gen *invA*). Sebanyak 14 isolat yang ditemukan memiliki kekerabatan dengan *Salmonella typhimurium.* Sejumlah 41 isolat bersifat resistan (80,39%) terhadap antibiotik dengan persentase dari yang tertinggi hingga terendah yaitu Streptomisin 37/51 (72,55%), Ampisilin 25/51 (49,02%), Siprofloksasin 13/51 (23,53%), Tetrasiklin dan Kloramfenikol 11/51 (23,53%), dan Sulfametoksazol-Trimetoprim 11/51(21,57%). Tujuh belas isolat (33,33%) terindentifikasi resistan terhadap 3 atau lebih golongan antibiotik (*Multidrug Resistance*). Keberadaan gen penyandi resistansi pada *Salmonella spp.* yang telah terisolasi yaitu gen *strA* 88,24%, *bla$_{TEM}$* 74,51%, *sul2* 49,02%, *tetA* 41,18%, *qnrS* 19,61%, dan *cmlA* 1,96%. Kesimpulan dari penelitian ini yakni hewan kesayangan yang diimpor ke Indonesia pada Bulan Oktober-Desember 2023 terdeteksi positif *Salmonella spp.* yang memiliki kekerabatan dengan *Salmonella typhimurium* dan sebagian besar mengalami resistan serta memiliki semua gen resistansi antibiotik.

Kata kunci: anjing, kucing, reptil, gen resistan, resistansi antibiotik, *Salmonella spp.*

ABSTRACT

STUDY OF DETECTION AND ANTIBIOTIC RESISTANCE ON *Salmonella spp.* ISOLATED FROM DOGS, CATS, AND REPTILES IMPORTED VIA SOEKARNO HATTA AIRPORT

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Salmonella spp. is an important zoonotic agent for animals and humans that has the potential for antibiotic resistance. Some *Salmonella spp.* isolates were recoginzed resistant to some antibiotics. Antibiotic resistance poses a global threat to public health, encompassing both animal health and the health of pet animals such as dogs, cats, and reptiles. The aim of this study was to detect Salmonella spp. in imported dogs, cats, and reptiles, and to identify their genetic relatedness, antibiotic resistance, and resistance encoding genes. The study utilized 123 samples, comprising rectal swabs from 26 dogs and 33 cats, and cloacal swabs from reptiles, including 12 turtles and 52 snakes. Isolation and identification were conducted using *Xylose Lysine Deoxycholate (XLD), Triple Sugar Iron Agar (TSIA),* dan *Lysine Indol Agar (LIA),* and *Indole, Methyl Red, Voges-Proskauer, Citrate (IMVic)* media. Resistance testing was performed using the *Kirby Bauer method.* Virulence genes were detected using the Polymerase Chain Reaction (PCR) method targeting the *invA* gene, while resistance genes were targeted using the *bla$_{TEM}$, tetA, strA, sul2, qnrS,* and *cmlA* genes. Sequencing results were analyzed using BLAST, and phylogenetic analysis was conducted using MEGA11 software. Data analysis was performed using descriptive statistics. *Salmonella spp.* was found in 51 out of 123 (41.46%) imported pet samples. The Salmonella spp. isolates came from 2 cats, 5 turtles, and 44 snakes, but no isolates were found from dogs. All Salmonella spp. isolates found were invasive (containing the *invA* gene). A total of 14 isolates found were related to *Salmonella typhimurium.* A total of 41 isolates were resistant (80.39%) to antibiotics with details of 37 isolates (72.55%) resistant to Streptomycin, 25 isolates (49.02%) resistant to Ampicillin, 13 isolates (25.49%) resistant to Ciprofloxacin, 12 isolates (23.52%) resistant to Tetracycline and Chloramphenicol, and 11 isolates (21.56%) resistant to Sulfamethoxazole-Trimethoprim. Seventeen isolates (33.33%) were identified as resistant to 3 or more classes of antibiotics (Multidrug Resistance). The presence of resistance encoding genes in *Salmonella spp.* that have been isolated are *strA* 88.24%, *bla$_{TEM}$* 74.51%, *sul2* 49.02%, *tetA* 41.18%, *qnrS* 19.61%, and *cmlA* 1.96%. The conclusion of this study is that pet animals imported into Indonesia in October-December 2023 were detected positive for *Salmonella spp.*, which is closely related to the *Salmonella typhimurium.* Additionally, most of them are resistant and possess all antibiotic resistance genes.

Keywords: dog, cat, reptile, resistant gene, antibiotic resistance, *Salmonella spp.*