



Antibiotic spectrum of bacteria isolated from gut sample of *Columba livia* (Rock dove) species

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ABSTRACT

Gut microbiota is important factor to maintain health of host species. The present study investigates gut microbiota of *Columba livia* (Rock dove) species. To study gut microbiota of *Columba livia* species, death bird was collected and gut sample was obtained by dissection. The gut sample diluted and spreaded on different agar plates (Macconkey's agar, Mannitol salt agar, Nutrient agar and Cetrimide agar). The isolates were identified using biochemical testing and morphological characteristics. The *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* were isolated from gut sample. Isolates were undergoing screening for antibiotic resistance and sensitivity using several antibiotics. The ampicillin antibiotic only shows resistant against *E. coli*, *S.aureus* and *P.aeruginosa*. The objective of this study is to isolate the gut microbes from gut sample of *Columba livia* species and evaluate for antibiotic spectrum.

Keywords: Bird, *Columba livia*, antibiotics, gut sample.

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INTRODUCTION

Birds are crucial to the health of humans, the economy, tourism and agricultural. The droppings of waterbirds are a significant supply of nutrients for rivers and lakes because there are such a wide variety of birds; they make excellent bio-indicators and are susceptible to environmental changes(1, 2, 3). An area of microbiology that is both of considerable scientific and commercial interest is the avian microbiome (4). Gut microbiota play important role in animals (5, 6). GI tract microbial colonization has been shown to benefit host birds (7). By being involved in host health, the gut microbiota's content may have an influence on host's fitness(8). Bacteria make up the majority of the microorganisms in the intestinal microbiota, wild bird's particularly migratory species, might have capability to carry a variety of microorganisms for far distance (9). Birds are the source or carrier for spreading the variety of infections and birds might be act as vectors in carrying and transferring the pathogens (10, 11, 12). Wild birds may serve as animal vectors for pathogens, transferring them along migratory paths and distributing zoonotic pathogens across a substantial region of the world via faeces (13). Hence, this study was undertaken to isolate the gut bacteria from gut sample of *Columba livia* species and evaluate for antibiotic spectrum.

MATERIAL AND METHODS

Collection of samples

The dead *Columba livia*(Rock dove) bird was collected; it was transported to the laboratory for evaluation in a sterile plastic bag. The gut microbiota of *Columba livia* was collected by dissection and diluting the gut content in saline suspension (14).

Isolation and Identification of organisms

1ml gut sample were serially diluted upto 10^{-6} fold and spreaded on selective agar plates like Macconkey's agar, Mannitol salt agar, Nutrient agar and Cetrimide agar for isolation of *E.coli*, *S.aureus* and *P.aeruginosa*. Incubate the spreaded plates at 37°C for 24 hours and observed for the suspected colonies of *E.coli*, *S.aureus* and *P.aeruginosa*. The identification of isolates was performed by routine bacteriological methods including morphological and biochemical tests. The isolated organisms were subjected to various morphological characteristics (like colony size, shape, gram staining and motility etc.) as well as biochemical tests (lactose fermentation, Catalase, Oxidase and IMViC test). The isolated, pure colonies of *E. coli*, *S. aureus*, and *P. aeruginosa* were cultured on nutrient agar slants and preserved at 4°C for future use.

Determination of antibiotic susceptibility pattern: The *E.coli*, *S.aureus* and *P.aeruginosa* isolates were evaluated for antibiotic susceptibility and resistance pattern using the Kirby-Bauer method using the

Clinical and Laboratory Standards Institute (CLSI) assessment methods (15). The *E.coli*, *S.aureus* and *P.aeruginosa* isolates were evaluated against different antibiotics as follows: chloramphenicol (25 µg), Tetracycline (25 µg), Cefaloridine (30 µg), Kanamycin (30 µg), Sulphatriad (30µg), Lincomycin (2 µg), Methicillin((5 µg), Streptomycin (10 µg), Norfloxacin (10 µg), Penicillin G (1 unit), Oleanomycin (15 µg), ampicillin (10 µg), Tobramycin (10 µg). All of the antimicrobial discs were obtained from Mumbai's Hi Media. All plates were aseptically introduced with antibiotic discs using sterile forceps, and incubated for 24 hours at 37°C (16).

RESULT AND DISCUSSION

The present study determined the prevalence of bacterial species isolated from gut sample of *Columba livia*. In this study the *Columba livia* sample was taken and gut sample was collected by dissection. The *E.coli*, *S.aureus* and *P.aeruginosa* were isolated from gut sample, these findings correlate with Mushtaq et al. (17). Biochemical tests and morphological characteristics were used to identify the isolates.

Biochemical characterization of isolates

The biochemical tests for identification of isolates were done. Table 1 displays the results of biochemical testing for *E.coli*, *S.aureus* and *P.aeruginosa* isolated from *Columba livia*.

Table.1 Biochemical Characterization of isolates

Test	<i>E.coli</i>	<i>S.aureus</i>	<i>P.aeruginosa</i>
Indole test	+	-	-
Methyl red test	+	+	-
Voges-proskauer test	-	+	-
Citrate test	-	+	+
Catalase	+	+	+
Oxidase	-	-	+
Lactose fermentation	+	+	-

Antibiotic susceptibility pattern in *E.coli*, *S.aureus* and *P.aeruginosa*

The isolated *E.coli*, *S.aureus* and *P.aeruginosa* were subjected for antibiotic susceptibility as well as resistance. The *E.coli*, *S.aureus* and *P.aeruginosa* isolate shows resistant against ampicillin antibiotics (fig.1).

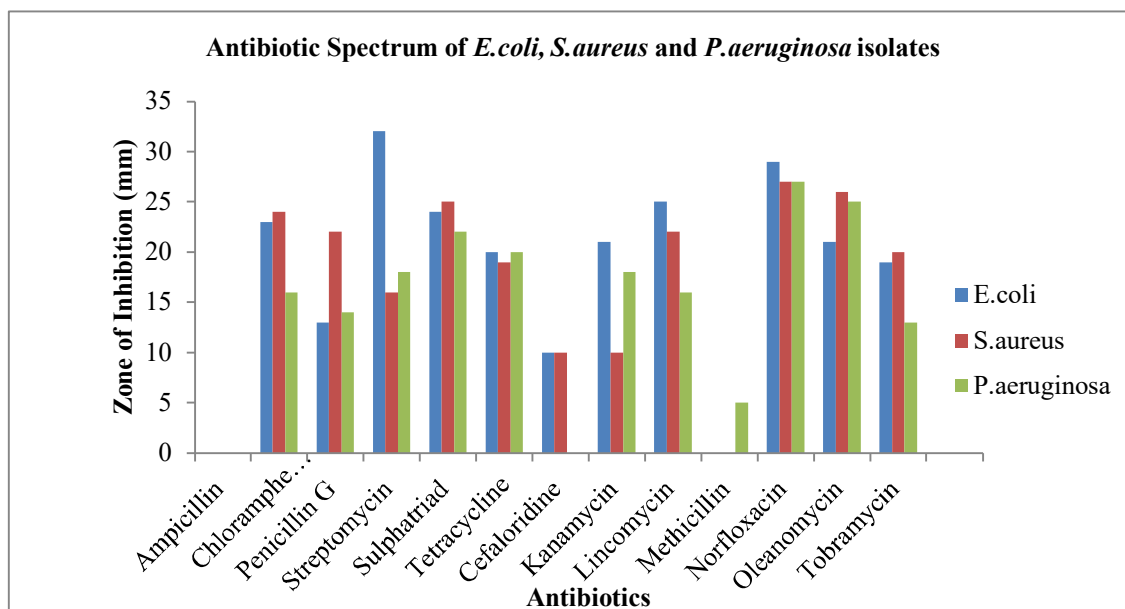


Fig.1 Antibiotic susceptibility pattern in *E.coli*, *S.aureus* and *P.aeruginosa*

CONCLUSION

Gut microbiota is important factor to maintain health of host species. The *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* were found in gut microbiota of *Columba livia* (Rock dove) species. The ampicillin antibiotic shows resistant against *E.coli*, *S.aureus* and *P.aeruginosa*. Based on the findings of this study, some pathogens are resistant to antibiotics, and the intestinal bacteria may be a source of zoonotic diseases.

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