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Isolation and identification of *Salmonella enterica* from Japanese quail in India

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Abstract

Salmonellosis is a major public health problem affecting both livestock and human. Necropsy was carried out in 40 eight day old Japanese quail chicks at Poultry Disease Diagnosis and Surveillance Laboratory, Namakkal, Tamil Nadu. Heart blood swabs and tissue samples were collected and subjected for bacterial isolation. The bacteria isolated from the samples showed the typical colony characteristics, morphological features and confirmed by standard biochemical tests. The *in vitro* antibiotic sensitivity test with different antibiotic discs was carried out to assess the sensitivity pattern of the bacterial isolate. The isolate was confirmed as *Salmonella enterica* based on the culture and biochemical tests. The *in vitro* antibiotic sensitivity test indicated that the bacterium was sensitive to Cefotaxime and fluoroquinolones and resistant to Gentamicin, Erythromycin, Neomycin, Oxytetracycline, Penicillin G and Tylosin. The isolation of *Salmonella enterica* from the internal organs of Japanese quail reveals the zoonotic importance of the organism and concern on food borne illness.

Keywords: Bacterial isolation, Japanese quail, *Salmonella enterica*

1. Introduction

In recent years Japanese quail (*Coturnix coturnix japonica*) industry created a big impact in India. Due to low initial investments, easy management and speedy financial returns many quail farms have been established throughout the country both for egg and meat production. Normally quails are more immune to infectious diseases than chicken. Still some of the infectious diseases are encountered in quails [1]. Among the food infections in human being, Salmonellosis is the major one. Salmonella infection is responsible for 93.8 million cases of gastroenteritis in human population of which 80.3 million cases are foodborne and it causes around 1.5 lakh human deaths every year around the world [2-6].

Salmonella infections of food animals play an important role in food safety and public health, as food products of animal origin like animal meat, poultry meat, eggs and egg products are considered to be the major sources of human *Salmonella* infection [7-11].

Palanisamy and Bamaiyi [12] isolated Salmonella from Kelantan quails in Malaysia using cloacal swabs. There has been no published report on the isolation of *Salmonella enterica* from Japanese quail in India. In this study *Salmonella enterica* has been isolated from Japanese quail chicks.

2. Materials and methods

2.1. Samples

Forty numbers of Eight days old Japanese quail chicks were brought to Poultry disease Diagnosis and surveillance Laboratory, Namakkal with a history of sudden death of 1000 chicks in a commercial quail farm in Tamil Nadu. Post mortem examination revealed hepatitis in majority of the chicks. Heart blood swabs and tissue samples from liver and spleen were taken for bacteriological isolation.

2.2. Isolation and Identification

The heart blood swabs and tissue samples were inoculated into Brain heart infusion agar and incubated aerobically at 37 °C for 24 hours. Growth characteristics of the isolate were recorded. Then, two loopful of cultures from brain heart infusion agar were streaked onto the Brilliant Green agar (BGA) (Himedia) and incubated at 37 °C for 24 to 48 hours.

Pink colour colonies from BGA agar suspected for Salmonella were inoculated into Triple sugar iron (TSI) slope and Salmonella differential agar (Himedia). For confirmation biochemical tests like Urease test, Indole, Methyl red, Voges proskauer's, Citrate utilization test, Lysine utilization, ONPG and sugar fermentation tests for lactose, arabinose, maltose, sorbitol and dulcitol were carried out as described by Quinn *et al.* [13]. For further confirmation the isolate has been sent to National Salmonella & E. coli Centre, Kasauli, HP, India.

2.3. Antibio gram assay

In vitro antibiotic sensitivity pattern of the bacterial isolate to various antibiotics has been detected by disc diffusion method as described by Bauer *et al.* [14].

3. Results

Brain heart infusion agar inoculated with the samples showed smooth transparent colonies. Gram staining of the smears made from these colonies revealed Gram negative coccobacillary organisms. Brilliant green agar inoculated with the colonies from brain heart infusion agar showed typical pink colonies. In TSI slope the reaction observed as R/Y/H₂S⁺. In Salmonella differential agar also pink color colonies were noticed. When the suspected Salmonella isolate was subjected to biochemical tests it produced positive reaction for Methyl red test; utilized Citrate and Lysine. The isolate not produced Indole; not hydrolysed the urea and negative for Voges proskauer's test and ONPG. The isolate fermented arabinose, maltose, sorbitol and dulcitol and not fermented lactose. The isolate was confirmed as *Salmonella enterica* by biochemical tests and further report from National Salmonella and E. coli Centre, Kasauli.

In vitro antibiotic sensitivity pattern of the *Salmonella enterica* isolate revealed the isolate was sensitive to Cefotaxime and fluoroquinolones (Gatifloxacin, Ofloxacin, Levofloxacin and Ciprofloxacin). The Salmonella isolate was resistant to Gentamicin, Erythromycin, Neomycin, Oxytetracycline, Penicillin G and Tylosin.

4. Discussion

There are not many reports published on the isolation of *Salmonella spp.* in quails and their public health significance. Previous study in USA no Salmonella was isolated from quail flocks [15]. Similarly Dipinetto *et al.* [16] could not isolate Salmonella from common quails in Italy. But *Salmonella enterica* has been reported in quail carcasses by some other workers [17, 18]. In Malaysia, Salmonella was isolated from live quail birds by using cloacal swabs [12]. In India no report available on Salmonella isolation from Japanese quail.

In our study the Salmonella isolate showed resistance to Gentamicin, Erythromycin, Neomycin, Oxytetracycline, Penicillin G and Tylosin. Recent times quail meat consumption also increased among Indian people so the

antimicrobial resistance genes to *Salmonella* may get transferred from quail to humans and other animals [19, 20]. So screening of *Salmonella* in farms has to be followed and strict biosecurity measures have to be adapted to control the *Salmonella* infection and there by enhance the food safety and public health significance.

5. Conclusion

Salmonella enterica has been isolated from Japanese quail chicks and the antibiogram pattern of the isolate revealed antibiotic resistance to commonly used antibiotics in human being and then posing a threat to public health. So screening of *Salmonella* in quail farms has to be strictly followed to minimize the food borne *Salmonella* infection to human.

6. References

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