DETECTION AND ANTIBIOTIC SENSITIVITY TESTING OF E.COLI AND SALMONELLA SPP IN FRESH AND OLD POULTRY DROPPINGS IN AND AROUND JABALPUR

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ABSTRACT
The study was designed with the aim to isolate and test the drugs sensitivity of E.coli and Salmonella from poultry droppings from the farms located in and around Jabalpur. All the samples were inoculated on different bacteriological media and various biochemical tests were performed for the confirmation of isolates. The results of the present study revealed that out of 120 samples, 60 samples were found positive for E.coli and 25 were positive for Salmonella. The highest rate of contamination recorded in fresh droppings in comparison to old droppings. These enteropathogenic bacteria may cause different diseases in birds as Salmonella can transmit through horizontal and vertical transmission. Drug sensitivity was performed for 8 antibiotics. Amikacin was the most effective inhibitor of E.coli and Salmonella while Oxytetracycline was the least effective inhibitor.

Keywords: E.coli, Salmonella, Poultry droppings, Entero-pathogenic bacteria, AST.

INTRODUCTION
E.coli and Salmonella are most common enteric pathogens; could be an important factor of gastrointestinal infection including colibacillosis, colisepticaemia, pullorum disease and fowl typhoid and paratyphoid [1] [2]. The quantity and quality of litter flora that gets accumulated from the droppings of birds, plays a significant role in ammonia release. Enteric pathogens which cause diarrhoea are responsible for wet litter conditions that
greatly favor the growth of urease producing bacteria \[^3\]. Urate splitting bacteria cause fermentation of the urates in the faeces under warm and moist conditions, leading to the production of ammonia. There was evidence that the number of microbes in fresh droppings was more than the number determined in old droppings \[^4\]. A much higher percentage of *E. coli* reported from broiler and layer faeces \[^5\] \[^6\] \[^7\]. The presence of *Salmonella* spp. in poultry faeces has been reported \[^1\] \[^8\]. A very high percentage of *Salmonella* in poultry faeces was reported by Akhtar et al. \[^9\]. Multiple drug resistance is a greater problem now a time. Drug sensitivity pattern showed by enteric bacteria have been studied time to time to get an appropriate choice of drug to inhibit the microflora \[^10\] \[^11\] \[^12\] \[^7\].

**MATERIAL AND METHODS**

A total of 120 faecal samples (60 fresh and 60 old) from 10 poultry farms located in and around Jabalpur. Droppings were collected separately in sterile test tubes and brought to laboratory for isolation and identification of bacteria. Processing of the samples was done according to the method described by Gibson et al. \[^13\].

**E. coli:**
Each sample was enriched in Nutrient broth and incubated at 37\(^0\)C for 24 hours. Each inoculum was streaked on Mac Conkey Agar, a differential media and pink colored colonies appeared after incubation at 37\(^0\)C for 24 hours. A single isolated colony was then picked and streaked on Nutrient agar slant. The cultural characteristics of isolates were confirmed by streaking the pure culture on Eosin Methylene blue Agar (EMB) and further various biochemical tests were performed tests as per standard procedures described by Cruickshank et al. \[^14\].

**Salmonella:**
Each sample was enriched in Nutrient broth and incubated at 37\(^0\)C for 24 hours. Each inoculum was streaked on Mac Conkey Agar, a differential media and yellow colored colonies appeared after incubation at 37\(^0\)C for 24 hours. A single isolated colony was
then picked and streaked on Nutrient agar slant. The cultural characteristics of isolates were confirmed by streaking the pure culture on Brilliant Green Agar (BGA) and further various biochemical tests were performed to identify the species. Sensitivity of microbes towards the antimicrobial drugs was determined using the single disc diffusion method described by Bauer et al.\textsuperscript{[15]}. With the help of a sterile swab suspension of a young culture was spread on the surface of Mueller Hinton agar plates. The antimicrobial drugs tested were selected on the basis of information supplied by poultry farmers. Disc of 8 antimicrobial drugs named Amikacin, Cephalexin, Ciprofloxacin, Enrofloxacin, Gentamicin, Nalidixic acid, Oxytetracycline and Sulfamethoxazole were used for testing sensitivity of \textit{E.coli} and \textit{Salmonella}.

RESULTS AND DISCUSSION

In the present study, it was found that out of 120 poultry droppings 85 samples were found to be positive for \textit{E.coli} (60) and \textit{Salmonella} (25). The number was found more in fresh droppings than the number determined in old droppings. This could be attributed to the higher moisture content of fresh droppings compared to old droppings, which favors the growth of microbes. The results for \textit{E.coli} being close to the percentage reported by Rahman et al.\textsuperscript{[5]}, Thangapandian et al.\textsuperscript{[6]} and Akond et al.\textsuperscript{[7]}. From fresh and old poultry droppings 20.83\% Salmonellae were isolated\textsuperscript{[1]}\textsuperscript{[8]}. The species included \textit{S. typhimurium} (15), \textit{S. gallinarum} (5) and \textit{S. pullorum} (5). Enteric bacteria like \textit{E.coli} are part of the normal flora of intestine. A significant number of birds are carriers of \textit{Salmonella} spp. and can spread the bacteria among birds both vertically and horizontally. The presence of these microbes has been reported in feces by other workers.
TABLE 1: PREVALENCE OF E. COLI AND SALMONELLA IN FRESH AND OLD POULTRY DROPPINGS

<table>
<thead>
<tr>
<th>Name of isolates</th>
<th>Total numbers</th>
<th>Isolates from fresh droppings</th>
<th>Isolates from old droppings</th>
<th>% of Positive samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escherichia coli</td>
<td>60</td>
<td>36</td>
<td>24</td>
<td>50</td>
</tr>
<tr>
<td>Salmonella typhimurium</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>12.5</td>
</tr>
<tr>
<td>Salmonella gallinarum</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>4.17</td>
</tr>
<tr>
<td>Salmonella pullorum</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>4.17</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>49</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

Out of the 60 isolates of E. coli from fresh and old poultry droppings 85% isolates were found to be sensitive to Gentamicin [16][7] which was followed by Enrofloxacin and Amikacin (80%) in similar manner [4] [7]. followed by Ciprofloxacin. Cephalexin was found less effective while 100% resistance were noted against Nalidixic acid, Oxytetracycline and Sulfamethoxazole. However sensitivity of E. coli towards Sulfamethoxazole has been recorded [5].

A total of 25 isolates of the genus Salmonella showed maximum sensitivity (96%) to ciprofloxacin [1] [11] [17]. The second effective inhibitor was Amikacin (80%) followed by Enrofloxacin (60%), Cephalexin (56%), Gentamicin (36%) and Nalidixic acid (8%). All the isolated were found resistant for Oxytetracycline and Sulfamethoxazole. More efficacy of Cephalexin, Gentamicin and Nalidixic acid has been reported against Salmonella spp [18]. Lower sensitivity towards effective drugs could be due to frequently use of antibiotics without proper monitoring those results in multiple drug resistance.

CONCLUSION

The result of the present study indicates the prevalence of for E. coli and Salmonella in fresh and old poultry droppings. Differences in the percentage reported could be due to factors like different agro climatic conditions and managemental practices. These enteric pathogens are very important for poultry industry as they are responsible for different diseases in poultry and directly associated with economic losses to poultry industry.
Faeces of apparently healthy as well as diseased birds are prominent source of urease positive bacteria and enteric pathogens. The load of such microbes in faeces can be greatly reduced by appropriate choice of drugs. Their use however, has to be carefully monitored as if it does not target the harmful microbes, its use could have an undesirable effect on the body. Besides, an increase in resistant forms could occur.

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