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ANTIBIOGRAM FOR ENVIRONMENTAL *E.COLI* RECOVERED FROM BROILERS

By

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ABSTRACT

A total of 192 samples were collected from eight hatcheries allover Egypt (Giza, Menofia, Alex, Ismalia, Sharkia, Albhara, Kaluobia and Gharbea Governorates. Twenty-four samples were collected from each hatchery. The samples were examined for detection occurrence of *E.coli* and The antibiogram for recovered isolates. Our study showed that, the Occurrence of *E.coli* in broilers environment reached 32.29%. with resistance against kanamycin, cephalexin, amikacin, cephaloridine, enrofloxacin and ampicillin. Moderate numbers (28-57%) of isolates were found to be resistant to ciprofloxacin, ceftiofur and tetracycline. Lesser percent (8.79-15.38%) of isolates were resistant to nalidixic acid, colistin and co-trimoxazoled, which has negative impact on broilers production and also affect public health.

Key words:

E.coli, Incidence, Antibiogram.

INTRODUCTION

Escherichia coli (*E. coli*) a member of family *Enterobacteriaceae* is a short Gram negative, non-spore forming and usually peritrichous and fimbriate bacillus. A capsule or microcapsule is often present and a few strains produce profuse polysaccharide slime. *E. coli* was first isolated by Theobald Escherich in 1885 from faeces of infants. It serves as a major facultative anaerobe throughout its life as a harmless saprophyte but **Larulle (1889)** was the first to suggest the possible role of *E. coli* as a pathogenic organism. *E. coli* has been shown to be a normal inhabitant of the gastrointestinal tract of animals and man **(Smith, 1965)**. The organism typically colonizes the infant gastrointestinal tract within hours of life and thereafter, both *E. coli* and the host derive mutual benefit **(Drasar and Hill, 1974)**. In the

debilitated or immunosuppressed host or when gastrointestinal barriers are violated even normal nonpathogenic strains of *E. coli* can cause infection. Pathogenic *E. coli* is one of the most important groups of bacteria causing diarrhoea and extra intestinal infections in humans and animals **(Levine, 1987).** Some pathotypes of *E. coli* are capable of causing intestinal diseases, while others referred to as extra intestinal pathogenic *E. coli* (ExPEC) and are responsible for extra intestinal infections. Usually, commensal *E. coli* isolates harbor no or only very few virulence factors (VFs), while ExPEC isolates have specialized VFs enabling them to colonize host surfaces, injure host tissues, and avoid or subvert host defense systems. ExPECisolates have been implicated in a wide range of human and animal infections. HumanExPEC, avian pathogenic *E.coli* (APEC),and other animaıExPEC isolates significantly overlap with respect to their O antigens, phylogenetic groups, and virulence genotypes **(Bidet *et al*., 2007).** Avian pathogenic *Escherichia coli* (APEC), the causal organism of *E. coli* infections of poultry, are responsible for significant morbidity and mortality in the poultry industry worldwide. Infection with APEC generally begins as a localized infection of the air sacs commonly referred to as airsacculitis or the air sac disease which in turn may spread to other internal organs resulting in systemic infection. This initial infection generally occurs in 4-9 week-old broiler chickens and in laying hens at the peak of egg production that takes place around week 30 **(Ewers *et al*., 2003)**. Bird simultaneously infected with various combinations of infectious bronchitis virus (IBV) and other viruses inevitably suffer from a damaged respiratory tract, causing them to become increasingly susceptible to invasion by APEC. Although to date, APEC is known to only infect poultry including chickens, turkeys, ducks etc., recent studies suggest the possibility of APEC being implicated in extra intestinal infections in humans as well. Avian strains show many similarities with human extra intestinal pathogenic *E. coli* (ExPEC) strains, in that most of the virulence genes they possess are similar to those identified in uropathogenic *E. coli* and new-born meningitis causing *E. coli* (NMEC) **(Johnson *et al* 2006).** So the aims of the present study are detection of the occurrence of *E.coli*. in broilers environment with special attention with antibiogram for the recovered isolates.

MATERIAL AND METHODS

Samples:

A total of 192 samples were collected from eight hatcheries all over Egypt (Giza, Menofia, Alex, Ismalia, Sharkia, Albhara, Kaluobia and Gharbea Governorates. Twenty-four samples were collected from each hatchery. Three samples were taken from each place in the hatchery. The places of hatchery are floor, air tunnels, hatchery machines, incubators, infertile eggs boxes, water taps surface, hands of workers and egg refrigerators. The swabs samples were collected in sterile screw capped swabs with saline and immediately transferred to the laboratory in a cold chamber container to be cultured without delay

Isolation and identification of *E.coli.*

Swabs were inoculated into Trypticase soya broth medium and incubated at 37°C for 72 hours. A loop-full from the inoculated medium was then subcultured onto the surface of MacConkey agar and blood agar media.All of the inoculated plates were incubated aerobically at 37°C for 24 hours. Smears from the suspected lactose fermenting colonies were stained with Gram stain and examined microscopically. Straight non sporulated Gram negative rods of medium size were selected for further identification. The suspected colonies were picked up and examined for their colonial morphology then preserved in semisolid agar for further identification. The biochemical identification was done according to **Murray *et al.* (2003).**

Antibiogram for *E.coli* isolates:

All purified isolates were tested by the standard disc diffusion method **(CLSI, 2012)** and were subjected to a susceptibility panel of antibiotics (Oxoid) belonging to different drug classes. Isolates were cultured in Trypticase soy broth (TSB) supplemented with 0.6% yeast extract, and transferred to Mueller-Hinton agar (Oxoid). The plates were incubated at 37ºC for 48 hours

RESULTS

Table (1): records a total of 192 examined samples from different places in Hatchery. The occurrence of *E. coli* in broilers environment reached 32.29%.

Type of samples	Number of examined samples	+Ve	%
Environmental samples			
1- Air tunnel	**24**	**8**	**33.33**
2- Incubators	**24**	**10**	**41.67**
3- Hatchery machines	**24**	**13**	**54.17**
4- Infertile eggs	**24**	**11**	**45.83**
5- Water tap surface	**24**	**6**	**25.00**
6- Workers hands	**24**	**5**	**20.83**
7- Egg refrigerators	**24**	**4**	**16.67**
8- floors	**24**	**5**	**20.83**
Total	**192**	**62**	**32.29**

O-ccurrence of *E. coli* in the examined samples.

In vitro antibiotic resistance pattern:

In vitro antibiotic resistance pattern against 12 antibiotics were detected. Higher percent (72-100%) of *E. coli* isolates showed resistance against kanamycin, cephalexin, amikacin, cephaloridine, enrofloxacin and ampicillin. Moderate numbers (28-57%) of isolates were found to be resistant to ciprofloxacin, ceftiofur and tetracycline. Lesser percent (8.79-15.38%) of isolates were resistant to nalidixic acid, colistin and co-trimoxazole.

DISCUSSION

Avian pathogenic *Escherichia coli* (APEC) are a group of *E. coli* that causes a variety of extra-intestinal diseases in chickens, turkeys, and other avian species. In fact, APEC is the most common bacterial pathogen affecting chickens, which costs the poultry industry hundreds of millions of dollars in economic losses worldwide **(Barnes *et al.*, 2008)**. Although APEC causes a variety of extraintestinal diseases in poultry, colibacillosis, airsacculitis/colisepticemia and cellulitis in broiler chickens, and salpingitis/peritonitis in commercial layer chickens are the most economically important to the industry **(Barnes *et al* ., 2008)**. The economic losses from colibacillosis arise from increased mortality, increased carcass condemnation rates at the

time of processing, decreased growth rate and decreased feed conversion efficiency of affected birds. In Brazil, the world's largest exporter of chicken meat, APEC is responsible for 45.2 % of condemned poultry carcasses **(Fallavena *et al.*, 2000)**. In addition to the negative economic impact, APEC is also considered as a major source for spreading antimicrobial resistance to other bacteria mainly through their plasmids and exchange of other genetic material **(Gyles, 2008).** Up to 92% of avian *E. coli* isolates were resistant to three or more antimicrobial drugs despite the strict measures on antibiotic use in the poultry industry **(Gyles, 2008).** Several biological and environmental stresses such as viral or mycoplasma infections, overcrowding and elevated levels of ammonia due to poor ventilation increase the probability of APEC infection **(Antao *et al.*, 2008).** In the present study the Occurrence of *E. coli* in broilers environment reached 32.29%. with resistance against kanamycin, cephalexin, amikacin, cephaloridine, enrofloxacin and ampicillin. Moderate numbers (28-57%) of isolates were found to be resistant to ciprofloxacin, ceftiofur and tetracycline. Lesser percent (8.79-15.38%) of isolates were resistant to nalidixic acid, colistin and co-trimoxazole, which has negative impact on broilers production and also affect public health.

CONCLUSION

E.coli consider as an important environmental and opportunistic pathogens for broilers with some evidence for multidrug resistant strains due to miss use of antibiotics which has negative impact on broilers production and also affect public health .

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