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SALMONELLA AND *ESCHERICHIA COLI* CONTAMINATION IN POULTRY FEEDS

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ABSTRACT

Poultry feeds are best-known to represent a source of bacterial infection to birds. *Salmonella* and *E.coli* are the two most vital food-borne pathogens of public health interest incriminated in poultry meat worldwide. *Salmonella enterica* causes variety of serious poultry diseases and is additionally a serious infective agent in humans. Most poultry infected by *Salmonella*become carriers, infection may additionally be fatal reckoning on the particular serovar and therefore the age of the bird at infection. Human gastrointestinal disorder outbreaks are coupled to contamination of animal feeds. As a result of consumption of foods containing *Salmonellae* thanks to cross contamination or inadequate preparation could cause human gastrointestinal disorder. The widespread incidence of *Salmonella* and *E. coli* in poultry feeds reinforces the necessity for effective management measures, hygiene in process and handling of feeds. This study implies on how environmental conditions in a poultry farm are harbouring *Salmonella* and *E.coli* bacterium, effects of those bacterium on human once consumed and therefore the management measures to be taken.

Keywords: Poultry feeds, *Salmonella spp., E. coli,* gastrointestinal disorders, management measures

INTRODUCTION

The intense international trade of animals and animal product facilitates the spread of *Salmonella spp*. making food poisoning a global public-health subject, accountable for serious economic losses to the poultry trade and governments **[10]**. *Salmonella spp.* and *E. coli*causes health issues in the world because they're the two most vital foodborne pathogens of family Enterobacteriaceae family as a cause of foodborne sickness that transmitted through poultry meat **[6]**. Prevalence of *Salmonella* in poultry meat using each traditional and standard strategies has been rumoured worldwide from shops, retail markets and process plants **[1]**. Though humans will become infected by *Salmonella spp.* through a large range of food product, poultry meat and eggs are among the foremost often involved sources of human *Salmonella* outbreaks **[10]**. Salmonellosis are major bacterial diseases in poultry trade worldwide **[9]**. Within the United States, non-typhoidal gastrointestinal disorder is number one foodborne sickness that leads to hospitalization and/or death, inflicting around one million diseases, 19,000 hospitalizations, and 380 mortalities (CDC, 2012) **[11]**. Human cases of *Salmonella* infection are common; within the United States, an estimated 1.4 million infections are rumoured once a year. Most of those cases occur as a result of consuming contaminated foods, significantly foods of animal origin **[3]**. Though it's been recovered from a spread of foods, *Salmonella* is traditionally associated with raw and undercooked poultry, and therefore could be a major concern for poultry processors. Poultry, more specifically chicken, could be a major vehicle for *Salmonella*. Sold as either whole body, parts, or ground meat, broiler chickens are a multi-billion-dollar each year trade within the United States (USDA-NASS, 2013) **[11]**.

It was reported that in India around 1.8 million people died from diarrhoeal diseases mostly because of contaminated food and water within the year 2005. The scientific investigations/reports on outbreak of foodborne diseases in India for the past 29 (1980–2009) years indicated that a complete of 37 outbreaks involving 3,485 persons are affected because of food poisoning. In India foodborne diseases don't seem to be categorised on an individual basis within the Health info of India. For an example, within the document of health info, Government of India for 2004, 9575112 cases of acute diarrheal illnesses as well as gastroenteritis with 2855 deaths have been recorded and cases of foodborne disease might be categorised under gastroenteritis **[14]**.

Salmonella

Salmonella is the second commonest reason behind foodborne diseases, it's liable for uncountable cases of foodborne sickness once a year. *Salmonella* might infect and caused diseases in humans through the handling of raw carcasses and their product, or through the consumption of undercooked poultry meat **[6]**. *S. typhimurium* is the most generally studied species of *Salmonella* and is a model for the invasion of mammalian cells by other *Salmonella species*. Moreover, chickens might represent a reservoir of *Salmonellae* that may probably infect humans, and are accountable for the majority of acute cases of human gastroenteritis **[12]**. Over 2,500 *Salmonella serovars* are known, most of that belong to the species *Salmonella bongori* and *Salmonella enterica.* Supported based on, *S. enterica* is divided into two broad groups. Group one consists of an outsized variety of serovars, together with *Salmonella entericaserovars typhimurium* and *Enteritidis,* which might cause infectious disease in infected animals. This group will colonize the duct of food animals, and may conjointly cause gastrointestinal disease in a very broad vary of hosts, together with humans. Group two contains alittle variety of serovars that cause general typhoid-like disease in a very restricted vary of host species. Examples include *Salmonella pullorum* and *Salmonella gallinarum* that cause pullorum disease and fowl infectious disease in poultry. In poultry, pullorum disease, fowl infectious disease, and infectious disease might end in a high rate in young birds, however affected adults generally have a nonfatal chronic or carrier status. In a carrier bird, *Salmonella* continually exists within the duct and therefore the system, and may therefore be transmitted to humans through contaminated eggs and meat. Humans consuming the contaminated eggs or meat might contract gastrointestinal disorder **[2]**.

Escherichia coli

E.coli O157:H7 is another major reason behind foodborne malady in humans **[12]**. Throughout the past twenty years, severe outbreaks of gastrointestinal sickness have occurred by food borne infective *E.coli*, particularly *0157:H7*. It's been well established that *E.coli* from colonised food animals are often transmitted to humans through the food supply. Humans become infected once they ingest contaminated meat or poultry product, or different foods, significantly raw foods that are cross-contaminated by contact with raw meat or poultry product. Some strains of *E.coli*, produce Shiga toxin that end in bloody diarrhoea that is an indication of a *Shiga-toxin producing E.coli injection*, it causes premature destruction of red cells that damages kidney causing haemolytic-

uremic syndrome. *E. coli* strains that cause diarrhoea have evolved by acquiring, through horizontal gene transfer, a selected set of characteristics that have successfully persisted among the host. To keep with the group of virulence determinants acquired, specific combinations were formed determining the presently known *E. coli* pathotypes that are collectively mentioned as *diarrheagenic Escherichia coli*. *E. coli* the other one among the opposite common microbial floras of alimentary tract of poultry. Among the diseases some are typically severe and generally fatal infections like infectious disease, endocarditis, tract infection, septicemia, epidemic diarrhea of adults and children and yolk sac infection, omphalitis, cellulitis, swollen head syndrome, coligranuloma and colibacillosisn **[18]**. Enteritis caused by *E. coli* (*colibacilliosis*) could also be a vital sickness inside the poultry trade as a result of increased mortality and diminished performance. *E.coli* might even be a number one reason behind acute renal disorder in children **[12]**. A diarrhetic epidemic in a village near to Vellore was investigated in January 1996 and it had been documented that *E.coli* was answerable for this eruption of symptom. Faecal samples were obtained from twenty subjects with symptom and from eleven people while not without and were examined for bacterial, infective agent and parasitic enteropathogens. Water and poultry meat samples from all sources inside the village were analysed. The epidemic affected all age groups. The mean period of symptom was eleven days. People who consumed water solely from a bore well had a lower relative risk (RR) of sickness, compared to users of 2 open wells **[19]**. The first route of infection is that the consumption of contaminated foodstuff, and outbreaks connected to the consumption of poultry meat are delineate. It was reported that *E. coli O157:H7* colonized the alimentary tract of chickens persistently following oral inoculation **[12]**. The first site of colonization, in terms of the sole numbers of organism recovered, was the ceca, although all components of the alimentary canal were colonized. *E. coli*, a natural inhabitant of the human internal tract and warm-blooded animals, is utilised as an indicator bacterium because these bacterium acquires antimicrobial resistance faster than different typical bacterium **[6]**. Its presence thus dependably reflects faecal contamination, indicating a potential contamination by enteric pathogens **[1]**. According to with, diarrhetic diseases caused by *E. coli* account for over 4% of the whole daily international illness burden on everyday basis and therefore the whole 1.8 million deaths occur once a year, of that over 90% are children **[6]**.

Basic control measures

The modernization of chicken farms and economic process of the bird breeding trade even have played a role in infection, with many serotypes being isolated from retail poultry product from a few years back in various parts of the globe **[1]**. *Salmonellosis* may be a human health concern, and therefore the prevention of *Salmonella typhimurium* colonisation of chickens is vital to poultry similarly on public health. Chicken carcasses have higher pathogenic and spoilage bacterium counts than most other foods, wherever carcass may be contaminated at many points of process operations such as throughout scalding, defeathering and evisceration similarly as cross contamination from other birds and process equipment. Throughout chicken slaughtering, carcass may be contaminated with faecal matters from the chicken intestine **[6]**. It's been reported that poultry and its product are a possible supply of resistant *Salmonella strains*. *Salmonella* may be a common infectious agent which will survive and go through the technological steps of poultry production **[13]**. Human gastrointestinal infections caused by salmonella sometimes are related to the consumption of poultry products; so, the management of this sort of pathogens is of great importance **[12].** It have been delineate that for *Salmonella* and *E.coli* successful control of the feed should be exposed to 85.7^{o} C temperature due to spores heat resistance **[5]**. Many various sorts of foods are supplies of the microorganism and are known as a possible source of *Shiga Toxin-producing E. coli (STEC)* that such raw or undercooked foodstuffs get contaminated either throughout primary production (e.g. slaughtering) or additional process and handling **[1]**. The management of *Salmonella* in poultry production is extremely complicated, because birds may be exposed to *Salmonella* not solely from wild birds however conjointly from flies. Also, it ought to be mentioned that the presence of pathogenic bacterium within the microbiota of broilers is a vital safety factor in the poultry trade **[13]**. Though antimicrobial agents aren't essential for the treatment of most *Salmonella* infections, they'll be lifesaving in cases of severe infection. *Enteroaggregative E. coli (EAEC)* and *Enterotoxigenic Fluoroquinolone resistant E. coli* strains typically show resistance to alternative medication like Ampicilin, Tetracycline, Chloramphenicol, Trimethoprin, Sulphamethoxazole and Gentamicin, with a major increase in fluoroquinolones resistant *E. coli* in several countries over the previous few decades **[1]**. Environmental monitoring could be a helpful, effective and fewer invasive technique to predict potential infection or

colonisation of the poultry flocks. The range of sources from that *salmonellae* may be introduced into flocks or houses complicates efforts to determine specific important management points for preventing animal disease *Salmonella* infections in poultry. Additionally, each poultry farm has its own risk profile for the introduction of pathogens, subsequent development of disease, and therefore the spread of pathogens to different farms. This risk profile is set by a complex interaction between the amount of infection in a region, the measures enforced on the farm to prevent disease, and alternative factors together with the density of farms within the area and linkages with different farms and markets. Minimizing *Salmonella* contamination in industrial layer hen houses needed never-ending improvement of the environmental monitoring method, strategies used for infectious agent detection, and therefore the management measures taken in poultry production **[10]**. Hence, the prevention or reduction of those pathogenic colonies within the intestines of birds could greatly reduce contamination of meat product, carcasses during processing, and table eggs **[6]**.

CONCLUSION

In recent years, with the increasing density of poultry and infectious diseases in poultry caused by infective bacterium, the healthy development of the poultry business is facing serious threat. The presence of *Salmonella spp.* and *Escherichia coli* in chicken meat are more than intestinal contents and rinse water. Thus, it's indicated that the contamination of *Salmonella spp.* and *Escherichia coli* in chicken meat not solely comes from intestinal contents and rinse water. Poor management of farming, overcrowding, dirty sanitation environment, bad ventilation, poor feed quality and stress will cause chicken to infect with diseases. Therefore, the way to take effective measures to stop and control infectious diseases from chicken is the task. The requirement of implementing a stricter hygiene and sanitation standard in slaughtering place to cut back the incidence of *Salmonella* and *E. coli.* Management of poultry diseases should include antibiotic sensitivity tests. This can be as a result of the incidence of resistance is attributed to improper and indiscriminate use of antibiotics. *Salmonella* and *E. coli* are bit by bit gaining a lot of immune to antibiotics. The indiscriminate use of antibiotics ought to be cautioned as a result of antibiotics can utterly lose their effectiveness against microorganisms particularly as *Escherichia coli* acquires antimicrobial resistance quicker than different typical bacterium due to increase resistance. This is necessary in preventing

the occurrence and spread of multi-drug resistant strains of bacterium.

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