**CHAPTER-1**

**Introduction**

*Escherichia coli* are Gram negative bacteria under the family Enterobacteriaceae. *E. coli* are widely distributed in nature, being present in soil and surface water and in animal and human feces. The most important reservoir of *E. coli* is the intestinal tract of animals and poultry (Bélanger et al., 2011). In addition, it is present on the bird’s skin and feathers. These bacteria cause colibacillosis in chickens which is characterized by air sacculitis,cellulitis,omphalitis,peritonitis,salpingitis,synovitis and coligranuloma.

**Classification of *E. coli*:**

Domain: Bacteria

Kingdom: Bacteria

Phylum: Proteobacteria

Class: Gamma Proteobacteria

Order: Enterobacteriales

**Family**: Enterobacteriaceae

**Genus**: Escherichia

**Species**: *Escherichia coli (E. coli)*

Explanation of Classification:

**Domain and Kingdom:** Escherichia coli fits into the domain and kingdom of Bacteria because members of this group are unicellular microorganisms.This disease has an important economic impact on poultry production worldwide. The majority of economic losses results from mortality and loss of productivity of the affected birds (Otaki et al., 1995). *E. coli* strains always belong to both pathogenic and nonpathogenic types (Pupo et al., 1997). In the caecal flora of healthy chickens, 10-15% of the *E. coli* strains may belong to an O-serotype. As soon as the first hour after hatching, the birds start building up their *E. coli* flora. The bacteria drastically increase their numbers in the gut. Birds may be infected with *E. coli* from contaminated environment, direct contact with sick birds, feces, water and feed (Dho-Moulin et al., 1999). Rodents may act as a carrier of avian pathogenic *E. coli* (APEC) and hence a source of contamination for the birds

(Barnes et al., 1997). Most of the strains of *E. coli* are harmless but some strains can cause food poisoning*. E. coli* food poisoning is usually caused by: enteropathogenic *E. coli* (EPEC) enterotoxigenic *E. coli* (ETEC); enteroinvasive (EIEC) and enterohemorrhagic *E. coli* (EHEC) (Mead et al., 1999).

*E. coli* enters the body through the consumption of food containing bacteria. Eating of inadequately cooked meat is the most common way that causes *E. coli* food poisoning. Raw poultry meat may contain *E. coli* that can cause food poisoning (Gormley et al., 2011). When a chicken is eviscerated, the healthy parts can be easily contaminated. Food animal such as cattle, pig and chickens appear to be reservoir of this organism (Geser et al., 2012) which in tern can act as the source of infection to human.

Animals carry harmless Escherichia coli in the intestines as part of the normal gut flora. Sometimes, they are carriers of pathogenic E. coli strains that can cause gastrointestinal illness in humans. The importance of these diarrheagenic E. coli (DEC) in causing foodborne diseases has been understood in recent years in Africa (Okeke, 2009), but very little is known about the reservoirs and routes of the infection on the continent. In general, meat products are considered to be an important source of DEC infections. The meat can be contaminated due to the poor hygiene practices during slaughter. Therefore, adherence to good hygienic practices in slaughter and meat production are essential for prevention of microbial carcass contamination and for ensuring the meat quality and health protection (FAO, 2005). Healthy asymptomatic animals may carry zoonotic pathogens and represent a reservoir for DEC, which may enter the food chain via the weak points in hygiene practices of the slaughter process (Hussein, 2007; Islam *et al.,* 2008; Rhoades *et al.*, 2009). The animals also play an important role in fecal contamination of drinking water sources and agricultural crops enabling direct transfer of zoonotic organisms to humans (Blanco *et al.*, 2003).

Multidrug resistance *E. coli* are produced due to the wild use of antibiotics in animal’s feeds as well as incomplete course of treatment against *E. coli* infection of humans and animals (Marshall et al., 1990).

Objectives:

1. To determine the prevalence and characteristics of *E. coli* in chickens at local markets of Chittagong Metropoliton area in Bangladesh.
2. To study the antibiotic sensitivity of *E coli* isolates in chickens to different antimicrobials..

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