



**EVALUATION OF INCIDENCE RATE OF COCCIDIOSIS IN BROILER
CHICKENS IN EAST AZERBAIJAN PROVINCE OF IRAN**

AGHAYARISAMIANF¹, HASHEMZADEHFARHANG H^{2*}, FEIZI A³

1: Department of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran

2: Department of Pathobiology, Collage of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran

3: Department of Clinical Science, Collage of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran

*** Corresponding Author's: E Mail: h_hashemzadeh@iaut.ac.ir**

ABSTRACT

Coccidiosis is caused by protozoa of the phylum Apicomplexa, family Eimeriidae. In poultry, most species belong to the genus *Eimeria* and infect various sites in the intestine. The aim of present study was to evaluate and assay the incidence rate of coccidiosis in broiler farms in Iran. In present study which was carried out during 2014, 200 fecal and mucosal samples were collected in four steps from broilers aged 7 weeks old. Samples were observed by direct microscopic method with distilled water and lugol stain then were confirmed by concentration of saturated sugar water method. In present study, sampling was done in 4 steps which are at the end of the rearing period. Results of our study are presented as below in which severity of disease was shown by +1, +2 and +3. In total, the contamination rate was 30% of 200 fecal samples. Statistical analysis of data shows that there is significant difference among steps ($P < 0.05$). Coccidiosis may be an important factor in the economic losses of the broiler chicks in this region. Therefore, further investigations and design appropriate control strategies in improving management of farms are necessary and strongly recommended.

Keywords: Contamination, Eimeria, Broilers, Iran

INTRODUCTION

Coccidiosis is caused by protozoa of the phylum Apicomplexa, family Eimeriidae. In poultry, most species belong to the genus *Eimeria* and infect various sites in the

intestine. The infectious process is rapid (4–7 days) and is characterized by parasite replication in host cells with extensive damage to the intestinal mucosa. Poultry coccidia are generally host-specific, and the different species parasitize specific parts of the intestine. However, in game birds, including quail, the coccidia may parasitize the entire intestinal tract. Coccidia are distributed worldwide in poultry, game birds reared in captivity, and wild birds (Ahmed et al., 2009). Coccidia are almost universally present in poultry-raising operations, but clinical disease occurs only after ingestion of relatively large numbers of sporulated oocysts by susceptible birds. Both clinically infected and recovered birds shed oocysts in their droppings, which contaminate feed, dust, water, litter, and soil. Oocysts may be transmitted by mechanical carriers (eg, equipment, clothing, insects, farm workers, and other animals). Fresh oocysts are not infective until they sporulate; under optimal conditions (70°–90°F [21°–32°C] with adequate moisture and oxygen), this requires 1–2 days. The prepatent period is 4–7 days. Sporulated oocysts may survive for long periods, depending on environmental factors. Oocysts are resistant to some disinfectants commonly used around livestock but are killed by freezing

or high environmental temperatures (Razmiand Kalideri, 2000).

Pathogenicity is influenced by host genetics, nutritional factors, concurrent diseases, age of the host, and species of the coccidium. *Eimeria necatrix* and *Eimeria tenella* are the most pathogenic in chickens, because schizogony occurs in the lamina propria and crypts of Lieberkühn of the small intestine and ceca, respectively, and causes extensive hemorrhage. *E. kofoidi* and *E. legionensis* are the most pathogenic in chukars, and *E. lettyae* is most pathogenic in bobwhite quail. Several *Eimeria* species are pathogenic in pheasants, particularly *E. phasiani* and *E. colchici*. Most species develop in epithelial cells lining the villi. Protective immunity usually develops in response to moderate and continuing infection. True age-immunity does not occur, but older birds are usually more resistant than young birds because of earlier exposure to infection (Sharma et al., 2013; Razmiand Kalideri, 2000).

Signs of coccidiosis range from decreased growth rate to a high percentage of visibly sick birds, severe diarrhea, and high mortality. Feed and water consumption are depressed. Weight loss, development of culls, decreased egg production, and increased mortality may accompany outbreaks. Mild infections of intestinal

species, which would otherwise be classed as subclinical, may cause depigmentation and potentially lead to secondary infection, particularly *Clostridium* spp infection. Survivors of severe infections recover in 10–14 days but may never recover lost performance (Razmiand Kalideri, 2000; Karaer et al., 2012).

The lesions are almost entirely in the intestinal tract and often have a distinctive location and appearance that is useful in diagnosis. The location in the host, appearance of lesions, and the size of oocysts are used in determining the species present. Coccidial infections are readily confirmed by demonstration of oocysts in feces or intestinal scrapings; however, the number of oocysts present has little relationship to the extent of clinical disease. Severity of lesions as well as knowledge of flock appearance, morbidity, daily mortality, feed intake, growth rate, and rate of lay are important for diagnosis. Necropsy of several fresh specimens is advisable. Classic lesions of *E tenella* and *E necatrix* are pathognomonic, but infections of other species are more difficult to diagnose. Comparison of lesions and other signs with diagnostic charts allows a reasonably accurate differentiation of the coccidial species (Karaer et al., 2012). Mixed coccidial infections are common. Practical methods of management cannot

prevent coccidial infection. Poultry that are maintained at all times on wire floors to separate birds from droppings have fewer infections; clinical coccidiosis is seen only rarely under such circumstances. Other methods of control are vaccination or prevention with anticoccidial drugs. The aim of present study was to evaluate and assay the incidence rate of coccidiosis in broiler farms in Iran.

MATERIALS AND METHODS

In present study which was carried out during 2014, 200 fecal and mucosal samples were collected in four steps from broilers aged 7 weeks old. Samples were observed by direct microscopic method with distilled water and lugol stain then were confirmed by concentration of saturated sugar water method.

In direct method, a little fecal sample was mixed with distilled water and lugol separately and prepared suspension was applied on the slide, then slides were assayed under the light microscope at 10 and 40 x magnifications and observing of *Eimeria*'s oocysts confirms coccidiosis.

In concentration of saturated sugar water method, about 5 g fecal samples was added into the solution then the tube was sealed by a slide and let 20 minutes till oocysts to be suspended. After 20 minutes tubes were centrifuged at 1500rpm for 5 minutes and a

droplet of supernatant was assayed by microscope.

Data were analyzed using SPSS ver. 19 software. T-test and ANOVA statistical methods were used for comparing incidence rate and frequency of contamination respectively.

RESULTS

In present study, sampling was done in 4 steps which are at the end of the rearing period. Results of our study are presented as below in which severity of disease was shown by +1, +2 and +3.

Our data showed that of 50 fecal samples in first step, 40 of them (80%) were without contamination to *Eimeria* oocysts and only 10 samples (20%) were infected. In first step, 2 samples were +1 rate (4%), 5 samples were +2 rate (10%) and 3 samples were +3 rate (6%).

In second step, our data showed that of 50 fecal samples, 19 of them (38%) were

without contamination to *Eimeria* oocysts and only 31 samples (62%) were infected.

In second step, 4 samples were +1 rate (8%), 10 samples were +2 rate (20%) and 5 samples were +3 rate (10%).

In third step, our data showed that of 50 fecal samples, 34 of them (68%) were without contamination to *Eimeria* oocysts and only 16 samples (32%) were infected.

In third step, 4 samples were +2 rate (8%) and 12 samples were +3 rate (24%).

In fourth step, our data showed that of 50 fecal samples, 35 of them (70%) were without contamination to *Eimeria* oocysts and only 15 samples (30%) were infected.

In fourth step, 4 samples were +2 rate (8%) and 11 samples were +3 rate (22%). In total, the contamination rate was 30% of 200 fecal samples. Statistical analysis of data shows that there is significant difference among steps ($P < 0.05$) **Table 1**.

Table 1: incidence and contamination rate of broilers chicks to *Eimeria*

Steps of sampling	No. of samples	Contamination rate	No. of oocysts	Range
1	50	20%	12.9	1-25
2	50	38%	9.89	1-30
3	50	32%	20	6-30
4	50	30%	19	6-30

DISCUSSION AND CONCLUSION

There was a significant difference in infection rate of coccidiosis in steps. The existence of genetic variation in resistance to coccidiosis among breeds and strains has been reported (Ashenafi *et al.*, 2004). In

recent studies from Ethiopia and North of Iran, no association was found between infection rate and breed (Gari *et al.*, 2008; Shirzad *et al.*, 2011; Oljira *et al.*, 2012). By attention to less study of breed, planning and conducting extensive research on the

impact and role of different breeds in the disease prevalence are essential. Evaluation of parasitic resistance in different breeds of poultry and selection of superior breed may play a significant role in reducing economic losses.

Epithelium damage caused by *Eimeria* is a major predisposing factor for necrotic enteritis (NE), allowing *Clostridium perfringens* to replicate rapidly and produce toxin, probably because leakage of proteins including plasma into the lumen of the gut during *Eimeria* infection provides the protein-rich nutrient substrates favorable to *C. perfringens* proliferation and toxin production. For these reasons, *Eimeria* spp. have often been used in conjunction with *C. perfringens* to induce NE experimentally (Al-Sheikhly and Al-Saieg, 1980; Shojadoost *et al.*, 2012). In current study, infection rate in farms was 30%; a significant relationship was observed similar to the finding of previous studies (Al-Sheikhly and Al-Saieg, 1980; Shojadoost *et al.*, 2012). Coccidiosis can play a significant role in the occurrence of NE when a sufficient number of toxigenic strains of *C. perfringens* type A are present (Shojadoost *et al.*, 2012).

Colibacillosis occurs as an acute fatal septicemia or subacute pericarditis, airsacculitis, salpingitis, and peritonitis. It is a common disease with global distribution

(Ahmed *et al.*, 2009). In this study, there was an increase of 16.5-fold of infection rate in farms with history of colibacillosis, which is in line to other hand (Ahmed *et al.*, 2009).

Dysentery is a serious sign in clinical coccidiosis (Adib-Nishaboori *et al.*, 2000). In the present study, 30% of chicks with dysentery were positive. Our results taken with previous investigations are consistent with the idea that the coccidiosis rate correlated with dysentery. Different hygiene conditions and management of the anticoccidial programs in farms, study design, methods, and different geographical regions may be the main cause of varied results. This is the first report of coccidiosis rate in broiler farms in eastern of Iran. Coccidiosis may be an important factor in the economic losses of the broiler chicks in this region. Therefore, further investigations and design appropriate control strategies in improving management of farms are necessary and strongly recommended.

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