TRADITIONAL AND MOLECULAR DETECTION OF EIMERIA SPP. IN GOAT IN BAGHDAD CITY

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ABSTRACT: Eimeria is an intracellular protozoan parasite, which infects a wide variety of animals causing a high mortality rate and leading to economic losses in livestock. Also, it has a relatively high prevalence in Iraq. This study was conducted to estimate the prevalence of Coccidiosis in goat in Baghdad city. Fecal samples collected from 180 goats, from both sexes, different age groups and months during the period from the first of October 2020, to end of March 2020. All fecal samples were examined by microscope and 100 samples that examined microscopically in parasitological lab were taken to the molecular examination and further analyzed using conventional PCR, sequencing and phylogenetic analysis. The microscopic results showed that the total rate of infection was 85% (153/180). The morphological criteria revealed presence of five species of Eimeria including, E. arloingi, E. alijevi, E. ninakohlyakimovae, E. chirstenseni and E. bovis. The highest prevalence was recorded with E. arloingi (33.33%), while E. chirstenseni and E. bovis were revealed the lowest; 11.11% and 4.44%, respectively. No significant differences were showed in concerned the groups of age and sex; however, significant variation was observed between the study months. Regarding PCR, results of 18S rRNA gene showed that 93% of fecal samples were positive to genus of Eimeria. Results for sequencing 13 samples were subjected to homology in the GenBank and Multiple Alignment. This study presented that seven samples were similar to E. arloingi, two samples E. chirstenseni and four samples as E. bovis. Positive isolates were recorded in NCBI with MW577416, MW577417, MW577418, MW577419, MW577420, MW577421, MW577422, MW577423, MW577424, MW577425, MW577426, MW577427 and MW577428 accession numbers.

Key words: Polymerase chain reaction, Coccidiosis, sequence, caprine, Iraq.

INTRODUCTION

Coccidiosis is one of the most important parasitic diseases of goats with worldwide distribution (Chartier and Paraud, 2012). Coccidiosis is caused by intestinal protozoan parasite of the genus Eimeria (Cavalcante et al, 2012). Coccidiosis lead to great economic importance in many farm of animals, especially young animals, due to clinical effect of the parasite which caused bloody diarrhea, dehydration, poor weight gain and anemia the required treatment costs (Chartier and Paraud, 2012). The parasite has two phases in life cycle, endogenous phase in which the parasite undergoes numerous divisions in the intestinal epithelial cells. Where the ingested sporulated oocysts release sporozoites in intestinal lumen (excystation), the exogenous phase (oocysts maturation) takes place outside of body in the environment under certain conditions (Hammond et al, 1965). Ingestion of contaminated food and water with sporulated oocysts are the main source of spreading the parasite and the symptoms of the coccidiosis such as diarrhea, weight loss, fever, dehydration, pale mucous and even death (Keeton and Navarre, 2018). The clinical signs of disease depend on the number of ingested sporulation oocysts (Peek 2010). Eimeria has sixteen species described in goats worldwide. Eimeria ninakohlyakimovae and E. arloingi are considered the most pathogenic (Khodakaram-Tafti et al, 2013). It is often difficult to identify individual species of coccidia due to their similarity in size and shape (Hendrix, 1998). Differentiation among these different species is depending mainly upon shape and measurements of oocysts, infection site and sporulation time (Tenter et al, 2002). Different diagnostic methods are available for specific identification Eimeria. Traditional methods are based mainly on oocysts morphological characteristics under microscopic examination, the morphological method is not fully reliable since natural infections by Eimeria are generally mixed with more than
showed significant difference (P≤0.01) between *Eimeria* species. Highest rate of infection recorded in *E. arloingi* (33.33%), while *E. christenseni* and *E. bovis* was observed at lowest proportion (11.11%), (4.44%) respectively. The study finding agree with Ibrahim (2012) in Saudia Arabia. In this study, one cattle species *E. bovis* was detected in goat due to the common grazing in most fields between goat and cattle may result in some hosts being infected with non-pathogenic or pathogenic *Eimeria* species of other host. This result showed no significant difference (p > 0.05) between infections of *Eimeria* species. This result was in agreement with Toulah (2007). This could be attributed to the exposure of animals to same *Eimeria* species through graze in the same pasture. This result showed no significant difference (p>0.05) between sexes. This result was in agreement with Daoud and Al-Bakray (2005). This results might be due to exposure to same environmental condition, management (Gharban and Al-Shaeli, 2021). The results showed no significant difference (p> 0.05) between three different age groups of animals that infected with *Eimeria* spp. This result was in agreement with Shaheed and Al-Azizz (2020). These results might be due to the animals’ immune status, poor sanitary conditions and overcrowding. The prevalence of *Eimeria* spp was recorded in goats. The highest infection rate was recorded in December 29/30 (96.66%) while the lowest in March 21/30 (70%) with significant differences (P≤0.01) between rate of infection. This result was disagreed with Vercruysse (1982). While, Al-Saadoon (2018) reported the higher prevalence of infection during the cold wet season and lower during the hot dry season. The high prevalence of *Eimeria* infection during the cold wet season may be due to climatic conditions, which were more suitable for sporulation and survival of coccidian oocysts. Regarding to molecular detection of goat *Eimeria* species the results confirmed three different species that which *E. arloingi*(seven samples) *E. christenseni* (two samples) and *E. bovis* (four samples), where the first two above species are a specific for goat,while the one later a specific for cattle. This result was in agreement with Al-Habisi (2017). The result of *E. bovis* was in agreement with Ibrahim et al (2015). So, the cause may be due to the common grazing in most fields between goat and cattle may result in some hosts being infected with non-pathogenic or pathogenic *Eimeria* species of other host.

**CONCLUSION**

Different *Eimeria* spp. can infect goat and nonspecific species recorded in study. Misdiagnosis can occur to the species of *Eimeria* with traditional methods due to morphological overlapping among species. Sex and age groups of goat showed no significate differences between them, all of them had the same infection rates. Molecular techniques are an accurate method in detection of *Eimeria* species.

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**REFERENCES**


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