A PRELIMINARY STUDY ON POSSIBLE EFFECT OF PLECTRANTHUS SPP. EXTRACT ON HISTOPATHOLOGY AND PERFORMANCE OF BROILERS CHICKEN INFECTED BY EIMERIA TENELLA IN TAIZ CITY, YEMEN.

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ABSTRACT: Coccidia specie is classified under the subkingdom protozoa of the phylum Apicomplexia genus Eimeria. Coccidiosis is a self-limiting, infectious disease of the digestive tract caused by host specific. Eimeria tenella (E. tenella) is the most pathogenic species of Eimeria which infected chickens. The aim of the present study was to examine the histopathological changes on the caecum of chicken infected with E. tenella and treated with some Yemeni herbal drug (Plectranthus spp.).

Some Yemeni’s herbals have strong effects on the inflammatory disease, fever and internal parasites and some species of protozoa such as coccidia. Aqueous extract of Plectranthus spp. was used to determine their effect on the cecal coccidiosis of chicken. Thirty broiler chickens aged 20 days were divided into 3 groups: Ten birds each. Each bird in groups A & B was challenge orally with 15,000 sporulated oocysts of E. tenella while, group C used as “negative control group” not infected / not treated. Nine day post-infected, group B was treated with extract Plectranthus spp. herbals of 15 mg/ kg for 15 days after the bloody diarrhea was seen. Group A didn’t treat.

The dropping was examined to notice the decreased in the oocysts numbers and the change in body weight among groups. Histopathological changes and damage of the tissue infused by the parasite in both groups A & B and the effect of herbals amelioration on the tissues was also studied and compare them with group C. Hematoxine & Eosin techniques for histopathological experiments and McMaster techniques for oocyst counting. The effects of herbal plants (Plectranthus) illustrated particularly in treated chickens after experimentally infected with E. tenella a positive anticoccidial herbal drugs activity where it has repaired some lesion, damaged and decreased some destruction in caecum tissue of chickens

Key word: Coccidia, Caecum, Chicken, Histopathological, Herbal drugs, Plectranthus
INTRODUCTION

Coccidiosis is a disease responsible for one of the major problems in poultry husbandry with significant economic impact on broiler chicken production (Haug et al., 2008; Chandrakesan et al., 2009; and Haritova et al., 2013). Coccidial infection of poultry is caused by Eimeria. There are different types or species of Eimeria that affect poultry and each is host-specific species meaning that a species that infects chickens does not infect turkeys and vice versa (McDougald, 2003 and Lillehoj et al., 2005).

E. tenella, the most pathogenic species of Eimeria in chickens, is usually located in caecum and causing caecal coccidiosis. Different Eimeria stages enter the cecal mucosa by penetrating villus epithelial cells, resulting in extensive destruction of the cecal epithelium, bloody dropping, reduction in body weight gain, decrease in feed efficiency and eventually mortality (Abdel-Wasae, 2001 & 2004; Naidoo et al., 2008 and Abbas et al., 2011). Coccidial infection has largely been controlled through the use of anticoccidial drugs to chicken feed (Guo et al., 2007). However, in some countries, plants and their extracts available forms of treatment from headaches to parasite infections, they also used for treat arthritic conditions, immune system problems, diarrhea, colic and other digestive upsets. Internal medical problems including liver, heart, stomach, lung and can be helped with many herbal formulas (Dinan et al., 2001). Furthermore, in some cultures, plant essential oils (and/or active components) can be used as alternatives or adjuncts to the used antiparasitic drugs (Vale et al., 2004 and Anthony et al., 2005).

Plectranthus spp. belongs to the family Lamiaceae, which also known as mint-family, is a large plant family containing 236 genera with 7173 species worldwide. This plant had been screened around 70 medicinal plants from the Arabian Peninsular region (Yemen and Saudi Arabia) for their antiplasmodial, antileishmanial and antitrypanosomal properties as reported by Mothana et al., 2014. Plectranthus spp is a large and widespread genus with a diversity of uses (Lukhoba et al., 2006). They are usually aromatic plants and some of the popular kitchen herbs like rosemary or oregano which belong to this family and their volatile oils are commonly used in aromatherapy (Abdel-Mogib et al., 2002 and Al Yemeni and Sher, 2010).

Although Plectranthus is widely in use, especially in cosmetic, flavor and fragrance industry, and in traditional medicine for a long time, some of them are yet to be described (Chaieb et al., 2007 and Chang et al., 2007). As well as, their therapeutic effects (anti-inflammatory, anti-tumor, antiseptic, antimicrobial, antihelminthics and antioxidant properties) and mechanism of action have not yet been well investigated. And the lack of present information on Plectranthus species renders this genus interesting for further investigation in botanical, phytochemical and pharmacological aspects (Lukhoba et al., 2006 and Pašoski, 2009). The main phytochemical constituents of the genus Plectranthus are diterpenoids, essential oils and phenolics (Schneider & Bucar, 2005; Sylvestre et al., 2007; and Onozato et al., 2009). Plectranthus spp. is used to
Coccidia, Caecum, Chicken, Histopathological, Herbal drugs, \textit{Plectranthus} treat a wide range of disease as (digestive problems, skin respiratory and urogenital infection) (Lukhoba et al., 2006). The medicinal flora in Yemen is not yet well documented, as researches in this subject are still limited. However, medicinal and aromatic plants are of great interest and use to Yemenis. There are accumulated experiences in using these plants as traditional remedies to cure an endless list of diseases in different areas of the country while others are used as cosmetics, condiments, coloring matters and flavoring agents (Mohammed, 2001 and Mothana et al., 2008). This study was aimed to determine the clinical evidence gross microscopic pathology and performance histopathological changes in chickens infected with \textit{E. tenella} and effects of herbal drug (\textit{Plectranthus} spp.) in dose of 1ml / kg when treated after infection.

**MATERIALS AND METHODS:**

**Experimental birds:** Twenty days old, 30 broiler chickens were bought from different local poultry farms in Taiz city- Yemen and kept in a clean wire cages with constant light. Recommended temperature. All chickens were individually weighed at the time of their placing into the cages. And also, weighed on days 21 to 45 of age. Chicken were divided randomly into 3 equal groups, 10 chickens each, as the following table:

<table>
<thead>
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<th>Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A &amp; B</td>
<td>Given orally 1 ml containing 15000 sporulated oocysts of \textit{E. tenella}, then group B was treated with 1 ml of 150 mg / kg from extract of \textit{Plectranthus} spp, once a day from the day 9 post infection (p.i.) (day 29 old) to the day (23p.i) day 45 old. Group C, was kept as control negative (non infected / non treated).</td>
</tr>
</tbody>
</table>

**Preparation of herbal extract:** \textit{Plectranthus} spp. was prepared as previously described by (Dutta et al., 2008). Fresh leaves were collected and washed by distilled water. Then they were dried, weight and crushed in an electronic grinder with 100 ml of distal water (DW) then infiltration and the dose was calculated and takes 1/ ml to 999 µl D.W.

**Identification of oocysts:** The morphology of sporulated as well as non sporulated oocysts was studied by light microscope using high resolving oil immersion objective lens (x100) with critically adjusted illumination. The length and width of 100 sporulated and non sporulated oocysts were measured with a calibrated ocular micrometer and
photographed using euromex digital photomicroscope camera.

**Weight determination:** five broiler chickens from each group were weight daily from the day 20 before infection and after infection until the day 45 of age.

**Gross pathology:** The effects of experimental infection of E. tenella and herbal treatment on post lesions were recorded in all groups.

**Histopathological studies:** Ten chickens were used for the histopathological experiments; two chickens from each group were scarified at the days (9, 11, 13, 15 and 23) (p.i). Tissues from the caeca were fixed in 10% formal saline solution and in 50% alcohol for 4-6 hour and stored in 70% alcohol then washed in 80%, 90%, 95% and absolute. And finally the specimens were embedded in paraffin wax, sectioned and stained with H&E. (Luna, 1968 and Amer et al., 2010).

**Statistical analysis:** Data were used of the analysis statistical package for the social sciences (SPSS) for windows version 15). The significance of differences was determined by analysis of variances (ANOVA) and T-Test.

**RESULTS**

**Identification of E. tenella oocysts in chicken’s dropping:** The identification of E. tenella was performed through detection of oocyst size and shape, demonstration of typical intestinal lesion, determination of prepatent period.

**Sporulation time and endogenous development stage:** Each chicken from groups A and B was infected with 15000 oocysts of E. tenella showed bloody drooping contained numerous of unsporulated oocysts of E. tenella in the day 6 post infection (p.i) which has ovoid shape and average size 22.35 X 20.30 µm from the infection until oocysts and blood drooping appeared in faeces was 144 hours p.i while the speculations time was 19 hours. The average size of oocysts size was 20.21 X 16.64 µm and the average sizes of sporocysts and sporozoites were 9.97 X 5.97 & 5.57 X 3.67 µm respectively in Table: (2).

Microscopic studies for the nonsporulated and sporulated oocyst showed outer and inner wall, sporocyst, sporozoite and steida body. Fig: (2A-C).

**Chickens body weight:** Chickens body weights were daily recorded after infection and after treatment. Change in body weight per gram of birds in all groups was recorded. Group A: Infected with E. tenella non treated with any extract or drug, had the lowest weight. They lost weight on day 4 p.i and the weight decreased till day 17 p.i. However the weight gain increased slowly as they became recuperating from infection. However, group B, infected this group a gradual increase in weight On 9th dp.i (day 1p.t), from the 4th dp.t (12 dp.i) and the weight gain rapidly increased until 23 days post treatment also, illustrated that there was significant differences in the values of weight between the control and infected chicken group A. birds in control group C: Showed normal increasing in weight for 23 days and listed the highest weights. Table: (3) & Fig: (3).

**Gross pathology:** All broiler chickens infected with E. tenella. And at 9 dp.i revealed bloody caeca and their lumens were filled with blood and its core became and stuffed by blood then they became harder and drier and passed in feces on 11th& 13th dp.i, the infection can be seen from the serosal surface of caeca as dark petechiae and foci on, 9th 11th,13th, 15th and 23rd dp.i, which became ballooned enlarged and thickened with
haemorrhagic contents. On the other hand, the oocysts of E. tenella were seen in the caecum from 7th dp.i to 23rd dp.i. Group B which infected / treated orally with Plectranthus spp. on 9th, 11th dp.i (1st, 3rd dp.t) showed bloody, dark caecum and its change in its size which become bigger than the normal and full by bloody drooping, on 13th dp.i (day 5pt) caecum was speckled by petechiae with foci on its surface and filled with dry and black dropping faeces. The oocysts were also seen in huge number in this group. On 15th day post infection (dp.i) (7th dp.t) caecum revealed nearly normal and softer, no blood in the dropping which had taken from caecum, and no oocysts of E. tenella seen in it. On 23rd day past infection (dp.i) (15th dp.t) caecum were normal in shape, size, and color, and no blood in faeces or oocysts was seen. However, No gross pathological changes were observed in group C, also normal intestinal tract and caecum with blush-pink color were noticed.

**Histopathological studies:** In the present study the examination of tissue sections and the histopathological changes of broiler chickens after infection with E. tenella revealed: diffuse lymphocytic infiltration of caecum and marked congestion of Lamnia propria. Normal (group C negative control): showed normal histological structure of mucosa, sub mucosa, and muscular is Lamnia propria Fig: (4 A&B) compared with infected and treated groups. In (group A) infected with E. tenella non treated at the 9th dp.i the sections showed many mature and large second generations of schizonts which developed deep in the Lamnia propria. Also, it was noticed numerous vacuoles and parasitophorous vacuoles this damaged cells were appeared without their nuclei or they were dislodge to the cell wall, and there were some inflammatory cells in the sections in group A (Fig: 5A & B). Moreover, it was clearly detected many Eimeria developmental stages of parasites in cecum it was clearly, with increasing in inflammatory cells and damaged cells. Some vacuoles was shown full with mucus on11th 13th dp.i. (Fig: 5 C & D). As well as, 15th dp.i. Parasite invasion was deep into the sub mucosa layer to the muscular layer, and many stages of parasites were seen clearly in mucosa layer (Fig: 5E). On the 23rd dp.i in many lesions showed severe mucosal and sub mucosal congestion. Additionally, the mucosal epithelium showed diffuse degeneration, necrosis, and infiltration and damaged of the Lamnia propria (Fig: 5F). On the other hand, (group B) infected with E. tenella / treated with Plectranthus spp. Showed repairs in major parts of caecum, and no parasite was seen in the end of experiments. At 9th dp.i (day 1 p.t.) cells were damaged, vacuolated and some parasite stages.

(Macro and Microgamete) were surrounded by parasitophorous vacuoles (Fig: 6 A & B). On 11th dp.i (day 3 p.t.). Infiltration and necrosis were recorded widely and clearly in the sub mucosa, and villi were damaged and Lamnia propria appeared smaller than normal. Necrosis and inflammatory cells were seen fewer than the last period and Lamnia propria showed without parasite stages (Fig: 6 C & D). On 13th to 15th day post infection (dp.i) (5to7dp.t.) recoveries were extended to major area, were crypts and Lamnia propria regained their normal shape and size. In sub mucosa some vessels and repaired connective were seen (Fig: 6 E). On 23rd dp.i (15th dp.t.)
connective tissue and blood vessels appeared clearly and normal, recovery cells covered major areas, no infiltration or parasites was seen, goblet cells appeared clearly and Lamnia propria regained its normal shape and size (Fig: 6 F). There were no mortalities in birds of groups A & B.

**DISCUSSION**

Coccidiosis is associated with reduced growth rate, impaired feed conversion leading to poor performance of broiler chickens and mortality (Chandrakesan et al., 2009). Eimeria species being one of the most dangerous diseases facing the poultry production industry (Bashtar et al., 2010). E. tenella is the most pathogenic species in chickens and the most common type (Mukiibi-Muka et al., 2001; Eraslan et al., 2004 and Abdel-Wasae & Alashwal, 2014).

The identification of oocyst of E. tenella in this present study has showed ovoid shape and the average size of 100 oocysts was 22.35X 20.30 µm, but Mojalli, (2009) reported average size 22.41X 19.47 and Amer et al., 2010 measured 21.39X18.75 µm. Some reports identified E. tenella by morphological features and pathological characteristic in the host (Fetterer and Barfield, 2003 and Klotz et al., 2007 and Abdel-Wasae & Alashwal, 2014).

In our study, the oocysts of E. tenella appeared from day 6 (equal to 144 hours p.i) in few numbers until day 8 when feces were completely stained or filled with blood when numerous numbers were present of oocysts, which is in agreement with Chandrakesan et al., (2009) and Abdel-Wasae & Alashwal, (2014). Oocysts count in group A (infected / not treated) decreased in the last days of our experimental study, and this was in opposition to Nweze and Obiwulu, (2008) whereas their infected dose was less than ours. While, in the treated group B with Plectranthus spp the oocysts continued to decrease in numbers until it became zero, which is similar to Mwale et al., (2006) who used Aloe vera and Aloe spicata to treated chickens infected with E. tenella. Also, similar results were reports by Silva et al., (2009 and Abdel-Wasae & Alashwal, (2014). On the other hand, the control group C had no oocysts in feces until the final day of the experiment and the level of oocysts per gram of feces in this group was zero.

The sporulation time recorded in the present study was 19 hours. This period is nearly equivalent to that reported by Mojalli, (2009) but less than 48 hours (Fetterer & Barfield, 2003). This may support the opinion that different sporulation times may be related to different experimental factors or laboratory techniques, or the lack of adequate oxygen Bashtar et al., (2010 and Abdel-Wasae & Alashwal, 2014). For weight gain, group A (infected with 15,000 oocysts of E. tenella / not treated) was showed a decrease in weight gain on days 3-9 p.i. until day 17 p.i. This has been previously shown in reports of (Nweze and Obiwulu, 2008 and Amer et al., 2010). And started to increase slowly because they started recuperating from the infection; this observation was reported with (Nweze and Obiwulu, 2008). Furthermore, some reported were showed that with an upper inoculation of more than 15,000 oocysts per chicken, the test subjects often undergo a decrease in weight till the last days of the experiment and sometimes mortality is encountered in day’s 6-10 p.i. Although some subjects was recovered (Hu et al., 2000). Abbas et
Coccidia, Caecum, Chicken, Histopathological, Herbal drugs, Plectranthus al., 2011, showed that the body weight gains in all the medicated groups were significantly higher than infected with E. tenella / non-treated groups as this work showed.

Also, it was observed a significant greater increase in the treated chickens’ with Plectranthus spp after infection with E. tenella while. Therefore, recent researches focused on the alternative strategies for the control of avian coccidiosis such as adding acids in the diet (Vale et al., 2004). Furthermore, acetic acid administered in drinking water has demonstrated anticoccidial effects against E. tenella in terms of improved weight gains, lower oocysts numbers and lower lesion scores (Abbas et al., 2011). For weight loss in group C (not infected / not treated group) the highest increase in weight, was reported as (Zhang et al., 2012).

Histopathological examination of group A (infected/ not treated) have shown many stages of the parasite E. tenella, and damage in the caecal tissues, including heamorrhage and the congestion of blood vessels. We have also noticed the loss of epithelial tissue, loss of villi, disruption of caecum, damage of Lamnia propria, necrosis of sub mucosa and mucosa tissue, and lymphoid cells showed hyperplasia and inflammatory cells in the mucosal layer (this damage noticed from day 7 pi) and became well-defined in the final stages. These finding are similar to those of (Soomro et al., 2001; Zulpo et al., 2007; Zhang et al., 2012 and Abdel-Wasae & Alashwal, 2014). In the present study group B, (infected /treated) which was treated with Plectranthus spp. extracts showed an effect on several stages and sporulated oocysts of E. tenella indicates that Plectranthus spp. is able to kill or inhibit the growth and development of oocysts and subserve the damaged cecal tissues to recovery after damage in Lamnia propria and crypts glands and the decrease in inflammatory cells until they have finally disappeared completely which were agree with (Zhang et al., 2012).

CONCLUSION

Plectranthus spp, is widely used as traditional treatment in Yemen for many parasites, skin diseases and inflammatory diseases. The effects of herbal plants (Plectranthus) illustrated particularly in treated chickens after experimentally infected with E. tenella a positive anticoccidial herbal drugs activity where it has repaired some lesion, damaged and decreased some destruction in ceacum tissue of chickens. And this is the first scientific study on using Plectranthus spp, as a treated for infected chickens agents coccidiosis (E. tenella).

RECOMMENDATION

1- There should be more further researches on herbal drugs (Plectranthus spp) used in this study as anticoccidial drugs on chicken infected with E. tenella.

2- The farmer should pay more attention to the use of this plant as anticoccidial drugs in chicken’s farms.

3- Add these herbal drugs (Plectranthus spp) with the food of chickens instead of the synthetic drugs because it is less cost.
Fig: (1A): Photo of Plectranthus sp. This plant leaves were collected from Al Hawban, in Al-Madehe village, Taiz-city it is local name is madan which used in this study.

Fig: (2A-C): Photomicrographas for the sporulated and non sporulated oocysts show: Outer layer (OR), Inner layer (IL), polar granule (PG), Large refractile glouble (LRG), Residual bodies (RB), Steida body (SB), Sporocyst (SC), Small refractile glouble (SRG), Sporozoite (SZ), Sporozoite nucleus (SZN), and Sporocyst residential (SCR).
Fig: 4 (A & B): Photomicrographs of a normal section (5 μ) of caecum tissue in experimental chickens (not infected or treated), notice: Goblet cell (G), Sub layer (SM), Muscle layer (M), Villi (v) and Lamina propria (LP). Crypts with the normal shape and size. All photos. X 100.
Fig: 5 (A-F): Histopathological sections from the caecum in the experimental chickens group A (Infected non treated), from 9\textsuperscript{th} dpi to 23 dpi stained with H&E. (A&B): At 9\textsuperscript{th} dpi the sections shown many mature and large second generations of schizonts with numerous vacuoles (V) and parasitophorous vacuoles (PV) also some inflammatory cells which appeared. (C&D): Many developmental Emirian stages of the parasites were appeared clearly, with increased in damaged cells. Some vacuoles were shown full with mucus on 11\textsuperscript{th} 13\textsuperscript{th} dp.i. (E): At 15\textsuperscript{th} dp.i. Illustrating necrosis (Nec) and infiltration (INF) in the sub muscles layer and extended to the muscles layer the tissue cells within parasite stages and vacuoles free from parasite. (F): At day 23 p.i. Shown the Infiltration (INF), large vacuoles (V), and damaged Lamnia propria (LP), notice the change in Lamnia propria size and shape. All Photos. X400.
Fig. 6 (A-F): Photomicrographs of sections 5µ of infection caecum in chicken with E. tenella and treated with Plectranthus spp. at different days. Stained with H&E (A&B): At 9th dpi appeared some parasitic stages macrogamete (MAC) and microgamete (MIC) with damaged cells of caecum tissues. Photo. X1000. (C): At 11th d.p.i. Showed the change of Lamnia propria (LP) and caecum glands in shape and size, inflammatory cells (INF) and damaged cells as vacuoles. Photo. X400. (D): At 13th d.p.i. Illustrated recovery (REC) and Lamnia propria (LP) become normal. However, there are some inflammatory cells (INF) in the sub muscles layer (SM). Photo X400. (E): At 15th d.p.i 5th to 7th d.p.i. Shown inflammatory cells (INF), semi normal of Lamnia propria (LP) and crypts glands (C) with recovery cells (REC). Photo X400. (F): At 23 d.p.i (15th d.p.i) Illustrating recovery crypts glands (C), the shape and size of villi glands (v) and Lamnia propria (LP) became normal, no parasite vacuoles seen. Photo X400.

Fig. (3): Standard deviation and percentage of change in body weight of the experimental groups infected with E. tenella and treated with Plectranthus spp. compared with control group of birds.
Table (1): Experimental chickens groups

<table>
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<tr>
<th>Group name</th>
<th>No. of chickens</th>
<th>Categorize</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>With E. tenella / non treated positive control challenged</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>Infected then treated with Plectranthus spp. extract.</td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td>Control: non infected / non treated negative control</td>
</tr>
</tbody>
</table>

Table2: Identification of E. tenella sporulated and unpopulated oocysts infected chickens experimental.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Unsporulated oocyst average size (µ m)</th>
<th>Sporulated oocyst average size (µ m)</th>
<th>Sporocyst average size (µ m)</th>
<th>Sporozoite average size (µ m)</th>
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<tr>
<td>Width</td>
<td>20.30</td>
<td>16.64</td>
<td>5.97</td>
<td>3.67</td>
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<tr>
<td>Length</td>
<td>22.35</td>
<td>20.21</td>
<td>9.97</td>
<td>5.57</td>
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Table 3: The average body weight, of birds experimentally infected with E. tenella and treated with Plectranthus spp. extrat.

<table>
<thead>
<tr>
<th>Day</th>
<th>Infected</th>
<th>Plectranthus</th>
<th>Control</th>
<th>P-value</th>
<th>Day</th>
<th>Infected</th>
<th>Plectranthus</th>
<th>Control</th>
<th>P-value</th>
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<tr>
<td>1</td>
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<td>400a</td>
<td>455a</td>
<td>408a</td>
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<td>N.S</td>
<td>385c</td>
<td>600a</td>
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<td>S.D</td>
<td>34.5</td>
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<td>67.2</td>
<td>408a</td>
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<td>475a</td>
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<tr>
<td>S.D</td>
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<td>68</td>
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<td>61</td>
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<tr>
<td>3</td>
<td>Mean</td>
<td>410a</td>
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<td>0.112974</td>
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<td>462a</td>
<td>445a</td>
<td>0.01308*</td>
<td></td>
<td>536c</td>
<td>692a</td>
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*= Significant (P < 0.05), N.S=Non significant (P > 0.05) and identical letters each row indicate not significantly different at P = 0.05%
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دراسة مبدئية عن تأثير خلاصة بلاكترنثس سبيشيز علي التغيرات المرضية النسيجية ومعدلات الأداء للدواجن المصريات تجريبيا باليمريا تينيلا، في تعز – اليمن

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قسم البيولوجي، كلية العلوم التطبيقية - جامعة تعز

تصنف الكوكسيديا تحت مملكة البروتوزوا شعبة الايبكمبلكسا جنس الايميريا. ومرض الكوكسيديا هو مرض يصيب الفئات الهضمية للعائل بواسطة طفيل اولي من جنس الايميريا، وهو المسؤول عن نقص انتاج الغذاء عالميا و الذي ينتجه الحيوان ويعتبر طفيل الايميريا تينيلا من النوع الممرض والذي يصيب الدواجن. وتهدف الدراسة لاختبار تأثيرات الخلاصة المرضية نسيجية (الهستوباثولوجي) للقولون الخاص بالدواجن المصابات باليمريا تينيلا (الإسبارديا تينيلا) والتي تنتج في بعض الالتهابات والحمى أيضاً على الاعشاب الأولية الداخلية المضادة للأمراض.

استخدم المستخلص المائي للنبات النوع (بلاكترنثس سبيشيز) لتحفيز تأثيره على مرض الكوكسيديا (الكوكسيديوز) خاصة الذي يصيب الدواجن في اليمن. استخدم في الدراسة 30 من الدواجن榔木حة بعمر 20 يوم وقسمت إلى ثلاث مجموعات هي A، B، C وكل مجموعة 10 دواجن. المجموعة A، B، C تم تأثييها بما يلي:
- المجموعة A: نازح تحت الأكياس البيضية للإسبارديا تينيلا عن طريق الفم للجرعة الواحدة.
- المجموعة B: استخدمت كمجمعة ضابطة (Contrrol) وذلك باستخدام علاجات سابقية لنبات (بلاكترنثس سبيشيز) باستثمار مائي للنبات لمدة 15 يوم وكل جرعة تلقت بجرعة مللي مول في الوزن.
- المجموعة B: بدون معالجة ودراسة تأثير الطفيل

بينما المجموعة C تحتوي على النسيج والوزن الدواجن. جميع الدواجن في المجموعات الثلاث غذت بالغذاء والمؤناء. وباختبار برز الدواجن لوحظ نقص متزايد لعداد الأكياس البضوية وتغيرات في الوزن في كل من المجموعتين الأولى والثانية وكذلك التغيرات الهستوباثولوجية والأضرار الناتجة عن الإصابة بهذا الطفيل مقاومة بالمجموعة

مفتاح الكلمات: كوكسيديا، إسبارديا تينيلا، القولون، هستوباثولوجي، العلاجات العشبية، (بلاكترنثس سبيشيز)، تعز – اليمن