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Clinicopathological Studies on the Effect of *Artemisia cina* (Sheih Baladi) on Coccidiosis in Chickens

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THIS EXPERIMENT was conducted to determine the effect of *Artemisia cina* on coccidiosis in poultry. A total of one hundred and fifty broiler chicks were divided to five equal groups, first group kept as control, second group was orally infected with $1X10^4$of *Eimeria tenella* oocysts. Third group was infected with the same dose of *Eimeria tenella* and treated with Artemisia water extract. Fourth group was infected with the same dose of *Eimeria tenella* and treated by Toltrazuril and fifth group treated by Artemisia and non-infected. The birds of all groups were kept under observation for 3 weeks post infection. Group II showed increased mortality rate (16.7%), with very high oocyste shedding 12 X 10^4 at the 6^{th}day post infection, increased total leucocytic count mainly heterophil, monocyte & eosinophil, and reduction of body weight as well as anemia. Liver function test showed increased in the activity of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) accompanied with hypoproteinemia and hypoalbuminemia. While, kidney function test showed increase in the level of uric acid and creatinine. Artemisia water extract treatment relatively minimize the infection, lowered mortality rate and oocyste shedding after and returned the liver and kidney function activities to normal level gradually as nearly as Toltrazuril. Also, Artemisia water extract induces significant increase in body weight of broiler as well as increased lymphocytic count, gamma and beta globulin, these findings indicating that Artemisia has a good effect on the immunity of the bird as compared with the group of chicks treated with Toltrazuril. It could be concluded that Artemisia were effective for controlling coccidia and have positive effect on body weight and survival rates nearly as Toltrazuril.

Keywords: Artemisia, Toltrazuril, *Eimeria tenella*, Poultry.

Avian coccidiosis is an enteric parasitic disease caused by multiple species of the protozoan parasite of the genus Eimeria and is considered one of the commonest and economically most important diseases of poultry world-wide, causing production losses, high morbidity (due to acute, bloody enteritis) and mortality rates (Shirley *et al.*, 2005 and Usman *et al.*, 2011). Infection with *Eimeria tenella* is followed by cecal lesions (petechial, thickening, ecchymosis, accumulation of

blood and caseous necrotic material) and bloody diarrhea. Coccidiosis is responsible for 6–10% of all broiler mortalities, and the global economic losses occur as a result of reduction in growth rate and feed conversion efficiency(Usman *et al.,* 2011). It is estimated that the annual loss worldwide is more than 3 billion US$ (Dalloul & Lillehoj, 2006 and Usman *et al.,* 2011). Consequently, there is increasing interest in the development of alternative strategies of disease prevention (Dalloul and Lillehoj, 2006). As part of this effort, there are studies on the effect of natural products on Eimeria infections and on protective immunity against these infections (Dalloul *et al.,* 2006, Hassan *et al.,* 2008 and Lee *et al.,* 2008).

Toltrazuril is one of the most effective anticoccidial drugs for controlling coccidiosis in chicken by increase immune index, body weight gain and survival rates (Salwa *et al.,* 1998). *Artemisia annua* is a plant whose dried leaves have been used in traditional Chinese medicine for over 2 millennia (Drăgan *et al.,* 2010). The effect of Artemisia plants on poultry coccidiosis was reported from USA for the first time (Allen *et al.,* 1997 and Abbas, 2012). Extensive studies have shown that artemisinin, an extract from *A. annua,* exhibits multiple studies on its anticoccidial in chickens infected with several species of Eimeria (Allen *et al.,* 1997, 1998, Youn & Noh, 2001, Arab *et al.,* 2006, Naidoo *et al.,* 2008 and Abbas, 2012). Moreover, it is also known to be very good modulators of the immune system in animals (Chew, 1995). Aside from antioxidants, and compared to traditional forages, Artemisia species also have high concentrations of essential oils which are useful in the maintenance of a favorable micro flora balance, suppression of rumen protozoa, increases nitrogen uptake and reduces methane production (Greathead, 2003). In the last few years were become established more restriction regarding using in poultry feeding of additives, growth promoters, antibiotics and Coccidiostatic. European Union forbidden antimicrobial growth promoters since 2006, and regarding the coccidiostats starting with 2012 is not clear if they will be still in use (Titilincu *et al.,* 2008).

This work highlights the effect of Artemisia on coccidiosis in chickens with studies to hematological and biochemical changes.

Material and Methods

Chicks

One hundred and fiftybroiler chicks (Cobb) at one day old were used. Chicks were assigned to five groups consisting of 30 chicks for eachgroup. The birds were kept floor reared in separate pens at a density of 8 birds/m^2, and offered a commercial balanced ration ad libitum (free from anticoccidial drug). At the 20^{th}day, chickens were infected with $1X10^4$*E. tenella* oocytes. The group treatment with water extract of Artemisia started in the same day with infection (at the 20^{th} day) and continued till the end of the study (41days). The birds of all groups were kept under observation for 3 weeks post infection for clinical signs and mortality. All birds were vaccinated against Newcastle and Gumboro

diseases with Hitcher, LaSota at the 4^{th}, 18^{th} and the 28^{th}days-old and Gumboro vaccines at the 14^{th} and the 24^{th}day-old.

Experimental groups

There were five experimental groups and each was having 30 chicks. The groups include: Group (I): The birds of this group were kept without any infection or medications as a control. Group (II): Birds were infected with coccidian (1 X104) /chick. Group (III): Birds were infected with coccidian (1 X104) /chick and treated with watery Artemisia extract at dose of (7.5ml/liter) in drinking water (Drăgan, et al., 2010) till the end of experiment. Group (IV):Birds were infected with coccidian (1 X104)/ chick and treated with Toltrazuril at dose of 1ml/liter for 48 hours at (20-21, 28 - 29 day old).Group (V):Birdswere kept without any infection and treated with wateryArtemisia extract at dose of (7.5ml/liter) in drinking water till the end of experiment.

Parasite and dose

The strain of *Eimeria tenella* used was obtained from the field strain from commercial poultry shops in Ismailia. The oocysts were preserved in 2.5% potassium dichromate solution to induce sporulation and kept in a refrigerator (2–5°C) until use. Each bird was challenged with 10,000 oocysts/chicken of *E. tenella* at the 20^{th} day of age.

Preparation of watery Artemisia cina extract

A 500 grams of crumbled Artemisia from a local retailer in Ismailia, Egypt were added to 1 liter of boiled distilled water in a sterile flask, then the flask left for 30 minutes at 20 °C for making Artemisia tea 5/10 (w/v). After this time period, the content of the flask was heated at 95°C for 1 minute, and filtered through sterile cheesecloth to another sterile flask and then filtered through a filter paper intoanother sterile flask. The content of the flask was cooled to a room temperature and used in the experiment (Youn and Noh, 2001).

Clinical observation and weight measurements

During periods of the study, the birds were examined daily for morbidity and mortality any clinical signs and changes in body weight were checked. Body weights were individually measured for 2 weeks post-infection.

Fecal sampling and oocyste counting

Fecal materials were collected from 5 to 10 days post infection. The fecal samples were analyzed for the presence of coccidial oocysts using a standard fecal flotation technique (Lee *et al.*, 2011). Briefly, 1 g from each sample was suspended with 5 mL saline and pelleted bycentrifugation at 1500×g for 5 min. The resulting pellet was re-suspended in saturated sodium chloride (aqueous) and passed through a sieve with a mesh size of 1 mm to remove coarse fecal debris. The resulting filtrate was used in a standard gravity vial fecal flotation using 22 mm×22 mm cover slips. After flotation, the cover slip was mounted on a slide and examined in its entirety for the presence of coccidial oocysts. Total numbers of oocysts were calculated using the following formula:

Total number of oocysts=oocyste count × dilution factor×(fecal sample volume/counting chamber volume)/number of birds per cage. Lesions corew scores as evaluated at the 7^{th} day (10 chicks) post-challengeusing a score of 0-4 (Johnson and Reid, 1970).

Blood sampling

Two blood samples, were taken from wing vein from10 birds of each group at the 7^{th}, the 14^{th} and the 21^{nd} days post infection, one sample was taken with anticoagulant for hematological examination and other for serum separation and biochemical analysis.

Hematological analysis

Complete blood picture (hemoglobin concentration, packed cell volume, red blood cell count and white cells count, as well as differential leukocytic count) were investigated (Jain, 2000).

Serum biochemical analysis

The collected sera were assayed for serum biochemistry. The level of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) according to Reitman and Frankel (1957), creatinine (Young *et al.*,1975) and uric acid (Caraway, 1963), total serum proteins (Henry, 1964), total albumin (Doumas, 1975) were determined by using Auto analyzer Hitachi 912.Serum protein electrophoresis: Fractionation of serum protein by polyacrylamide gel electrophoresis was done after Laemmli (1970).

Statistical analysis

The data were reported as the mean ± S.E. Statistical significance was determined using analysis of variance according to (Snedecor and Cochran, 1982). Means were compared by Least Significance Difference (LSD) test at $P<0.5$ significance level according to (Steel and Torrie, 1980).

Results

Clinical signs: Bloody diarrhea of almost all treated and infected experimental groups was observed from the 4^{th} to the 6^{th} day after challenge with *E. tenella*. In the groups treated with watery extract of Artemisia (0.75%) and Toltrazuril, the extent of bloody diarrhea was milder than that observed in other groups and as compared with the control negative groups (Table 1). The survival rates of chickens infected and treated with *A. cina* and anticoccidial Toltrazuril were (100%) in both groups as compared with that of infected non medicated group (83.3%). The lesion scores increasedin infected non-treated groups in comparison to treated groups during the experimental period (Table 2). The mean values of body weight gain in various groups at different weeks after the treatment are shown in Table 3. At the end of experiment, the body weight gain in the grouptreated with 0.75% water extract of *A. cina* and toltrazuril (1420g and 1360g) respectively were significantly higher than that of infected group (920g). Excreted oocysts in the groups treated with ration supplemented with

0.75% water extract of *A. cina* (GIII) and Toltrazuril (GIV) (38.000,and 65.000) respectively were lower than that of the infected group (199.000/g of feces) (Table 4). Results of hematological changes were illustrated in Tables 5-7. The biochemical tests were tabulated in Tables 8 & 9.

TABLE 1. Bloody diarrhea of chickens challenged with *Eimeriatenella* and treated with *A. cina* or toltrazuril.

Groups	Blood in feces (days afterinfection)				
	3	4	5	6	7
GI	-	-	-	-	-
GII	-	+	+++	+	-
GIII	-	+	+	-	-
GIV	-	+	+	-	-
GV	-	-	-	-	-

TABLE 2. Mortality rate, lesion score and survival rate in treated and untreated groups.

Groups	No	0-5 days post challenge		6-15 days post challenge		16-21 days post challenge		Total Mortality	Mortality %	Survival rate
		Dead bird	lesion score	Dead bird	lesion score	Dead bird	lesion score			
GI	30	0	0	0	0	0	0	0	0	100
GII	30	2	2.7	1	2.5	2	2.8	5	16.7	83.3
GIII	30	-	0.8	-	0.5	-	0	-	-	100
GIV	30	-	1	-	0.5	-	0	0	0	100
GV	30	0	0	0	0	0	0	0	0	100

TABLE 3. Mean body weight in treated and untreated groups at the end of the experiment

Groups	Average body weight
GI	1350 ± 8.6^{b}
GII	920 ± 2.1^{a}
GIII	1420 ± 5.6^{c}
GIV	1360 ± 8.6^{b}
GV	1440 ± 3.4^{c}
LSD	28

TABLE 4. Oocyste excretions from chickens treated withArtemisia and challenged with *Eimeriatenella*(x1000).

Groups	Days						Total
	5	6	7	8	9	10	
GI	0	0	0	0	0	0	0
GII	0	120	58	22	7	2	199
GIII	0	9	22	6	1	0	38
GIV	0	22	30	8	4	1	65
GV	0	0	0	0	0	0	0

Discussion

Coccidiosis remains one of the most economically important diseases in poultry industry. Control of coccidiosis has been focused on prophylaxis with anticoccidial drugs in food. Their extensive use has inevitably led tothe development of drug resistance, and as a consequence, alternative control strategies against avian coccidiosis were studied. The new approaches include the use of natural products, probiotics, live vaccines, improved farm management practices, and modulation of the chicken immune system (Allen & Fetter, 2002, Dalloul & Lillehoj, 2005, Titilincu *et al.,* 2008 and Abbas, 2012).

It has been reported that the water extract of *A. cina* were suppressive towards the development of coccidiosis in chicks (Allen *et al.,*1998 and Abbas, 2012). Bloody diarrhea of all treated and infectedgroups were seen during 4-6 days after infection with *E. tenella*. But the extent of bloody diarrhea in the groups treated with water extract of *A. cina* was milder than that of other groups. Also, *A. cina* water extract causes an increase the body weight gain, improves lesion scores and decrease oocysts output were noticed in the infected and treated groups. Oocyste counts were carried out on 5, 6, 7, 8, 9, 10 days after the infection. The counts were zero in control group and non-infected treated *A. cina* group (GV). Large number of oocysts was produced in all the infected groups. However the oocysts count of birds treated with Toltrazuril and water extract of *A. cina* and were significantly lower than the infected non treated group. Kostadinovic *et al.* (2012) reported that bloody diarrhea, the oocysts output and mortality rate were lower in all the treated groups as compared to the infected un-medicated control group. Comparing the medicated groups, the birds treated with 3 mg/kg *Artemisia absinthium* extract showed better results in terms of oocyste count per gram of feces. Titilincu *et al.* (2008) and Brisibe *et al.* (2008) reported that the growth of the broilers were enhanced following the addition of *A. annua* leaves in the starter and finisher diets because of its high protein content and presence of essential minerals such as sodium, potassium, zinc and manganese, amino acids and vitamins. *A. cina* also has an inhibitory effect directly on the oocysts sporulation and damaging effect of sporulated oocysts (Arab *et al.,* 2006, Drăgan, *et al.,* 2010 and Kostadinovic *et al.,* 2012). Mehlhorn *et al.* (1988) reported that toltrazuril is effective against all species of *Eimeria* infecting chickens. Also, reported that toltrazuril is active against all intracellular developmental stages including those of schizogony and gametogony. Greif (2000) who reported that despite high efficacy of toltrazuril, it does not interfere with the development of natural immunity but can even enhance it. Mathis *et al.* (2004) demonstrated that toltrazuril was an effective aid to certain anticoccidial program as well as effective as a stand-alone anticoccidial.

It was clear that infection with *E. tenella* causes macrocytic hypochromic anemia at 1st week. Fatma *et al.* (2008) stated that the infection with *E. tenella* caused severe anemia due to severe hemorrhage which is caused by the second generation schizonts development.

TABLE 5. Hematological picture in broiler chicks experimentally infected with Coccidia and treated groups (n=10)

Time	Parameter	Group					*P*≤ 0.05
		GI	GII	GIII	GIV	GV	
1W	RBCs (×10^6 /µl)	2.5 ± 0.06^a	1.35 ± 0.1^b	1.55 ± 0.07 ^{b}	1.54 ± 0.19 ^{b}	2.3 ± 0.06^a	0.06
	Hb (g/dl)	6.5 ± 0.3^a	4.21 ± 0.2^b	4.3 ±0.16^b	4.5±0.23^b	6.2 ± 0.3^a	1.0
	PCV (%)	36.4±0.4^a	31.8 ±0.9^b	31.3±0.35^b	31.6±0.3^b	35.9±0.4^a	2.0
	MCV (fl)	14.4 ±0.5^a	23.6 ± 0.4^b	20.2 ±0.5^b	20.5 ±0.42^b	15.6±0.5^a	2.1
	MCH (pg)	26.0 ±0.21^a	31.2 ±0.31^b	27.7±0.33^b	29.2± 0.5 ^{b}	26.95±0.21^a	1.2
	MCHC (g/dl)	17.9 ± 0.7^a	13.2 ±0.05^b	13.8 ± 0.06^b	14.2 ± 0.43^b	17.3± 0.7^a	2.2
	WBCs(×10^3/ µl)	1.76±0.03^a	2.53±0.36^b	2.56±0.2^b	2.50±0.2^b	1.80±0.03^a	0.5
	H (×10^3/ µl)	0.91± 0.01^a	1.30 ± 0.3^b	1.36± 0.1^b	1.23±0.2^b	0.90± 0.01^a	0.3
	L (×10^3/ µl)	0.75± 0.02^a	0.50±0.02^b	0.55 ±0.1^b	0.56 ±0.3^b	0.80± 0.02^a	0.1
	M (×10^3/ µl)	0.04±0.01^a	0.18±0.01^c	0.19±0.01^c	0.14±0.01^c	0.10±0.01^b	0.07
	E (×10^3/ µl)	0.05±0.01^a	0.55± 0.03^b	0.56±0.03^b	0.57±0.02^b	0.05±0.01^a	0.15
2W	RBCs (×10^6 /µl)	2.28 ± 0.1a	1.49± 0.11b	2.24±0 .1a	2.10± 0.1a	2.26± 0.1a	0.3
	Hb (g/dl)	14.3 ± 0.5a	4.13±0.2b	13.6±0.31a	14.13±0.4a	14.6±0.5a	4.0
	PCV (%)	28.5 ± 0.4a	9.9±0.6b	28.4±0.5a	27.6±0.4a	28.6±0.2a	6.0
	MCV (fl)	12.5 ± 0.4a	6.64±0.7b	12.6±0.26a	13.1±0.5a	12.7 ±0.4a	4.2
	MCH (pg)	62.7 ± 0.5a	27.7±0.4b	60.7±0.47a	67.3±0.27a	64.6±0.3a	7.8
	MCHC (g/dl)	50.2 ± 1.9a.	41.7±0.9b	47.8±4.11a	51.1± 2.09a	51.0±0.6a	5.1
	WBCs(×10^3/ µl)	1.19 ± 0.09a	1.22±0.08a	1.86±0.23a	1.26±0.2a	1.98±0.23a	0.5
	H (×10^3/ µl)	0.37 ± 0.3a	0.36± 0.3a	0.28± 0.3a	0.30± 0.4a	0.30± 0.3a	0.1
	L (×10^3/ µl)	0.74 ± 0.2b	0.76± 0.2a	1.50± 0.4b	0.87± 0.3a	1.60± 0.4b	0.2
	M (×10^3/ µl)	0.05 ± 0.01a	0.08±0.01a	0.05± 0.03a	0.06± 0.02 a	0.05± 0.03a	0.1
	E (×10^3/ µl)	0.03 ± 0.01b	0.02±0.01a	0.03± 0.03b	0.03± 0.02b	0.03± 0.03b	0.05
3W	RBCs (×10^6 /µl)	3.2± 0.1a	1.34 ± 0.1b	3.3 ± 0.12a	3.38 ± 0.18a	3.4 ± 0.14a	1.2
	Hb (g/dl)	9.8±0.8a	4.18±0.37b	9.9±1.09a	9.8±0.9a	9.7±0.9a	2.5
	PCV (%)	26.5± 1.4a	10.11±0.8b	27.0±2.35a	26.7±1.7a	26.9±2.35a	4.8
	MCV (fl)	82.8 ±0.9a	75.4 ±1.6b	81.8 ±1.8a	78.99 ±1.3a	79.1 ±1.8a	3.0
	MCH (pg)	30.6 ± 0.5a	31.2±0.46a	30.0±0.7a	28.99±0.58a	28.5±0.7a	3.6
	MCHC (g/dl)	36.98 ± 3.4a	41.3±3.87ab	36.7±3.6a	36.7±3.6a	36.1±3.6ab	4.9
	WBCs(×10^3/ µl)	1.76±0.20a	2.34±0.14b	1.99±0.27a	1.86±0.29a	1.89±0.27a	0.3
	H (×10^3/ µl)	0.74± 0.2a	1.29± 0.3b	0.79 ± 0.5a	0.78 ± 0.4a	0.75 ± 0.5a	0.4
	L (×10^3/ µl)	0.92± 0.1a	0.68 ± 0.3b	1.08± 0.4a	0.96± 0.3a	1.15± 0.4a	0.2
	M (×10^3/ µl)	0.05± 0.01a	0.14± 0.01b	0.06 ± 0.02a	0.05 ± 0.03a	0.06 ± 0.02a	0.03
	E (×10^3/ µl)	0.05±0.01a	0.23± 0.05b	0.06 ± 0.03a	0.07± 0.02a	0.06 ± 0.03a	0.04

RBCs = total erythrocytic count Hb=hemoglobin. PCV = packed cell volume. MCV= mean corpuscular volume MCH Pg. = mean corpuscular hemoglobinMCHC = mean corpuscular hemoglobin concentration.
WBCs= Total leucocytic count. H= Heterophils. L= Lymphocytes M=Monocytes. E= Eosinophils.

TABLE 6. Some biochemical tests on broiler chocks experimentally infected with coccidia and infected treated groups.

	AST µ/l			ALT µ /l			Uric acid mg/dl			Creatinine mg/dl		
Groups	**1w**	**2w**	**3w**	**1w**	**2w**	**3w**	**1w**	**2w**	**3w**	**1w**	**2w**	**3w**
G I	47.1±3.3^{a}	85.9±3.4^{a}	66.5±0.6^{a}	12.96±0.2^{a}	15.16±0.3^{a}	14.9±0.3^{a}	4.9±0.9^{a}	6.7±0.5^{a}	5.8±0.8^{a}	0.48±0.06^{a}	0.44±0.05^{a}	0.48±0.03^{a}
G II	123.6±4.5^{b}	142.1±0.9^{b}	127.2±1.9^{b}	24.3±0.34^{b}	19.32±0.3^{b}	21.2±0.8^{b}	9.4±1.0^{b}	10.6±0.5^{b}	9.8±1.2^{b}	1.0±0.1^{b}	1.12±0.13^{b}	0.72±0.1^{b}
G III	121.6±1.6^{b}	91.2±1.13^{a}	69.8±2.4^{a}	20.88±0.2^{b}	16.1±0.44^{a}	15.8±0.3^{a}	8.4±0.8^{b}	6.1±0.8^{a}	6.1±0.6^{a}	0.62±0.11^{a}	0.48±0.05^{a}	0.55±0.07^{a}
G IV	120.9±0.8^{b}	90.3±1.6^{a}	71.1±2.98^{a}	21.9±0.15^{b}	14.16±0.3^{a}	15.9±0.2^{b}	8.8±0.9^{b}	6.6±0.8^{a}	6.4±0.6^{a}	0.68±0.1^{a}	0.54±0.05^{a}	0.54±0.04^{a}
G V	46.5±2.1^{a}	79.9±3.4^{a}	64.5±0.3^{a}	13.16±0.2^{a}	14.16±0.1^{a}	14.1±0.1^{a}	4.5±0.3^{a}	6.2±0.4^{a}	5.1±0.2^{a}	0.5±0.06^{a}	0.48±0.05^{a}	0.51±0.03^{a}
P≤0.05	12.46	5.98	7.4	5.2	2.2	2.3	2.7	1.9	2.5	0.23	0.23	0.2

There was a marked increase of the total leucocytic count, heterophil, monocyte, and eosinophil accompanied with lymphocytopenia during the first weeks in infected non treated and treated groups(II,III and IV) and that may be attributed to stress condition of infection then changed by time towards the normal value till the end of experiment (Fatma *et al*., 2008). With regarding to the treated groups by A. cina there was significant increase in lymphocytic count in the second and third weeks this may be due to the immunostimulant effect of Artemisia (Allen & Fetter, 2002, Dalloul & Lillehoj, 2005 and Zhongjuan, 2011) stated that the immunostimulant effect of Artemisia on chicken by increase the expression of IL-6 and TNF-α in macrophages and promote T cellular immunity.

Serum ALT and AST activities, uric acid and creatinine were significantly increased in infected groups of chickensand this may be due to the impaired liver function and injury of liver and kidney parenchyma due to the harmful effect of Eimeria parasite. These findings agreed with Sena *et al*. (1997), Salwa et al. (1998) and Fatma *et al*. (2008). The infected and treated groups showed an increase in liver and renal function tests at the first week then returned gradually to the normal levels in the second and third weeks. The observed decrease in total serum proteins on first week post-inoculationwith E. tenella in chickens, which may be due to cease of feeding, sloughing of mucosal epithelial cells of caecum and bloody diarrhea (Ruff & Augustine,1982 and Allen *et al*., 1998).

Hypoproteinamia, hypoalbuminemia and increased gamma and alpha globulins were observed at the1stweek post infection in all infected and treated groups. Ruff and Augustine (1982) reported that In E. tenella-infected chickens, the albumin was decreased, but the alpha, beta, and gamma globulins were increasedand had returned to normal by the day 10 post inoculation. On the other hand, there were significant increase in gamma and alpha globulins during the 2nd and the 3rd weeks in treated groups by A. cina this may be due to their immunostimulant effects (Allen & Fetter, 2002, Dalloul & Lillehoj, 2005 and Titilincu *et al*., 2008).

Conclusions

Through this study, we noticed that A.cina prevent Coccidia similar to Toltrazuril. Coccidiostatic effect was observed with A. cina extract at dose of (7.5ml/liter) in drinking water, significantly reduced bloody diarrhea, lesion score and oocytes shedding as compared to the infected groups. A. cina could be a potential source of protection agents against coccidiosis in chickens.

TABLE 7. Proteins profile (g/dl)in Serum ofbroiler chicks experimentally infected with Coccidia and infected treated groups

Time	Parameter	Group					*P*≤ 0.05
		GI	GII	GIII	GIV	GV	
W1	Total proteins	3.1 ±0.03[a]	2.68±0.1[b]	2.69±0.01[b]	2.71±0.02[b]	3.0 ±0.03[a]	0.3
	Albumin	2.1±0.04[a]	1.38±0.02[b]	1.35±0.05[b]	1.42±0.05[b]	1.9±0.04[a]	0.2
	Globulin	1.0±0.09[a]	1.3±0.11[a]	1.34±0.06[a]	1.29 ±0.04[a]	1.24±0.1[a]	0.5
	α- globulin	0.3±0.02[a]	0.4±0.022[b]	0.4±0.03[b]	0.42±0.13[b]	0.40±0.03[b]	0.05
	βglobulin	0.2±0.04[a]	0.3±0.03[b]	0.3 ±0.04[b]	0.32±0.12[b]	0.30±0.04[b]	0.07
	ϒ-globulin	0.4±0.03[a]	0.6±0.02[b]	0.64±0.12[b]	0.55±0.04[b]	0.54±0.12[b]	0.1
W2	Total proteins	2.82±0.01[a]	1.79±0.1[b]	3.26±0.02[a]	3.22±0.02[a]	3.10±0.1[a]	0.4
	Albumin	1.48±0.1[a]	1.2±0.03[b]	1.41±0.1[a]	1.44±0.05[a]	1.4±0.1[a]	0.18
	Globulin	1.34±0.1[b]	1.2±0.1[b]	1.85±0.1[a]	1.48±0.05[b]	1.7±0.1[a]	0.3
	α- globulin	0.24±0.01[a]	0.20±0.1[a]	0.35±0.11[b]	0.28±0.22a	0.30±0.11[b]	0.2
	βglobulin	0.2±0.01[a]	0.2±0.21[a]	0.20±0.04[a]	0.2±0.11[a]	0.20±0.04[a]	0.15
	ϒ-globulin	0.9±0.01[a]	0.8±0.02[a]	1.30±0.05[b]	1.0±0.45[a]	1.20±0.05[b]	0.1
W3	Total proteins	2.78±0.02[a]	2.89±0.03[a]	3.12±0.01[a]	2.67±0.01[a]	3.25±0.01[a]	0.3
	Albumin	1.54±0.1[a]	1.60±0.02[a]	1.56±0.02[a]	1.42±0.04[a]	1.50±0.02[a]	0.28
	Globulin	1.24±0.04[a]	1.29±0.1[a]	1.57±0.1[b]	1.25±0.1[a]	1.75±0.1[b]	0.12
	α- globulin	0.24±0.02[a]	0.22±0.1[a]	0.36±0.13[b]	0.23±0.11[a]	0.34±0.13[b]	0.1
	βglobulin	0.2±0.12[a]	0.22±0.11[a]	0.21±0.2[a]	0.2±0.23[a]	0.21±0.2[a]	0.14
	ϒ-globulin	0.8±0.0.12[b]	0.82±0.11[a]	1.00±0.03[b]	0.8±0.13[a]	1.20±0.03[b]	0.15

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دراسات باثولوجيه اكلينيكية على تأثير الشيح البلدي (الارتيمسيا) على الكوكسيديا في الدجاج

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أجريت هذه التجربة لتحديد أثر الشيح البلدي على الكوكسيديا في الدواجن. إجمالي مائة وخمسون فرخ تسمين قسمت إلى خمسة مجموعات متساوية، المجموعة الأولى كضابطة والمجموعة الثانية اعطيت ايميريا تينيلا بجرعة١ × ٤١٠ عن طريق الفم والمجموعة الثالثة وكان مصابة بنفس جرعة تينيلا ايميريا وعولجت بمستخلص الشيح المائي والمجموعة الرابعة كان مصاباً بنفس جرعة ايميرياتينيلا وعولجت بالتولترازوريل و المجموعة الخامسة تمت معاملتها بمستخلص الشيح المائي وغير مصابة. وأبقيت الطيور من جميع الفئات تحت الملاحظة لمدة ٣ أسابيع بعد الإصابة. المجموعة الثانية أظهرت زيادة في معدل الوفيات (١٦,٧٪) ، مع زيادة عالية جدا في معدل تبويض الكوكسيديا (١٢ × ٤١٠) في اليوم السادس بعد العدوى، ووجد زيادة عدد كرات الدم البيضاء وهيتروفيل والمونوسايت والايزينوفيل وانخفض في وزن الجسم مع فقر الدم. وزيادة في انزيمات الكبد مصحوبة بنفص نسبة البروتين والألبومين بينما اسفرت وظائف الكلى عن وجود زيادة في نسبة حمض اليوريك والكرياتين. وقد اسفر استخدام مستخلص الشيح الى تقليل العدوى بخفض معدل الوفيات ومعدل التبويض لطفيل الكوكسيديا مع عودة انشطة وظائف الكبد والكلى الى المستوى الطبيعي تدريجيا مثل اثر العلاج بالتولترازوريل. ايضا كان تأثير مستخلص الشيح واضحا في زيادة وزن جسم الطائر مع زيادة عدد الليمفوسايت والجاما والبيتا جلوبيولين. وهذه النتائج تشير الى ان مستخلص الشيح له تأثير جيد على مناعة الطائر بالمقارنة بالعلاج بالتولترازوريل. ومن ذلك يمكن الاستنتاج بأن الشيح كانت له الفاعلية للسيطرة على الكوكسيديا وله تأثير ايجابي على معدلات الوزن والبقاء على قيد الحياة تقريبا مثل تأثير التولترازوريل.