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EFFECT OF SOME ENVIRONMENTAL AND CHEMICAL AGENTS ON THE DEVELOPMENT OF THE MOST PATHOGENIC EIMERIA SPECIES OOCYSTS OF GOATS

BY

H.A. KA-OUD*, E.I. RAMADAN** AND ZAMZAM H. ABDEL-WAHED***

* Dept. Hygiene, Nutrition and Animal Ethology, Fac. Vet. Med. Cairo University.

** Dept. Parasitology, fac. Vet. Med. Cairo University.

*** Dept. Hygiene, Fac. Vet. Med. Canal Seuz University.

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INTRODUCTION

The incidence of infestation with Eimeria species among 1-3 months old kids was high with extreme frail and severe diarrhoea (Abdel-Halim et al., 1991). However over-crowded muddy pastures and shelters with unhygienic condition increase the rate of reinfection and accumulation of large numbers of Eimeria oocysts in the intestine, particularly in young animals which may die due to diarrhoea, emaciation and chronic debility (Hume, 1971; Korkin et al., 1979; Lima, 1980 and Otify, 1984).

Beside treatment of diseased animals, contolling the oocystic stage is of great importance. This is achieved by application of hygienic measures with particular emphasis on the use of effective protozoacide.

The present work is dealing with the effect of physical factors on the development of most pathogenic

Eimeria species of goats and the evaluation of the efficacy of some chemical compounds against representative Eimeria.

MATERIAL AND METHODS

Faecal materials were directly collected from the rectum of 4 kids (2 months age) of Zariby goats suffering from severe diarrhoea. The samples were collected in separate polyethylene bags.

The faecal samples were examined for Eimeria, Globidium and Cryptosporidia oocysts. The total counts and differential percentage of each oocystic type were made (Dorney technique, 1964). The identification of the individual species of Eimeria oocysts was conducted by studying the sporulation time and morphological feature according to Keys of Kheysin (1972); Levine (1973) and Lima (1980).

The effect of some physical and chemical agents on the vitality and survival of the Eimeria oocysts were studied as follows:

Experiment (1): The effect of physical factors: 2 sets of infested faecal masses (10 g each) (Enyenini 1969), one set was kept in-door environment (shade) at room temp. (25 $\pm$ 3°C) and R.H. 70 - 80%. The other set of faecal masses was subjected to out-door environment (sun-light and dessication). At certain intervals (1,3,7,10,15,25 and 30 days) one of the faecal masses was removed for:

(a) Testing the ability to sporulation in 2% pot. dichromate
(b) Determination of moisture content of faecal mass (Tucker, 1967). In addition the temperature of the environment was recorded daily.

Experiment (2): The effect of chemical agents on the oocysts:

Test chemical compounds:

1. Ammonia solution (32 % NH_3) 5% and 10%
2. Iodophore (2-3% active iodine) 1:80 and 1:150.
3. Calcium hypochlorite (35% chlorine content) 3% and 5%.
4. Calcium hydroxide 3% and 5%.
5. A commercial emulsified coal tar disinfectant (Cresol) 3% and 5%.
6. Diazinon (Diethyl 2-isopropyl 6-methyl -4-pyrionidinyl phosphorothionate) 0.1% and 1%.
7. Ectomin Ec 100, 0.1% and 1%.

Technique: 50 g of infested faecal material were used for each concentration, where the faecal mass was completly wetted and mixed throughly with each concentration under test. After 24 hours, samples from treated faeces were subjected to vitality test. A control test was carried out.

RESULTS AND DISCUSSION

Table (1), and Plate 1, (A,B,C,D) showed that, faecal samples of all four examined goats were mixed infested with four species of Eimeria oocysts namely, E. *arloingi*, E. *ninakohlyakimovae*, E. *faurei* and E. *parva* with a mean percentage of 62.3, 19.7, 14.4 and 3.6% respectively. No Globidium or Gryptosporidia oocysts were detected. The identified species of the E.oocysts were similarly detected by Saying(1965); Misra & Mahpatr (1972) Korkin et al., (1979) and in Egypt by Otify (1984) and Abdel-Halim et al., (1991). E. *arloning* and E. *ninakohlyakimovae* were encountered in the present work with comparatively high percentages in all examined kids (62.7 % and 19.7% respectively). This may be explained by the pathological potential in suffering goats (in agreement with Prasad, 1981; Otify; 1984 and Abdel-Halim et al., 1991).

Table (1): Mean total and differential numbers of Eimeria species oocysts per gm faeces of 4 goats and oocystic sporulation time.

Oocystic mean total number,/ gm faeces	Mean percentage of different types of Eimeria species			
	E.arloingi	E.ninakohlyakimovae	E.faurei	E.parva
27750±2916 (24000-31600)	62.3	19.7	14.4	3.6
sporulation time (control)	1-2 days	1-2 days	1-2 days	1-2 days

Table (2): Effect of out and in-door condition on the sporulation of E.oocysts (arloingi, ninakohlyakimovae, vaurei and parva).

Time of exposure in days	out-door condition			in-door condition			
	M.cont. %	Av. temp.	Affinity to sporulat.	M.cont. %	Sun-light exposure	Average temp.	Affinity to sporulation
1	70	28.2 °C	90%	70	Average 2, 6 hours per day	32.6 °C	90%
3	66		90%	63			80%
7	58		80%	50			30%
10	52		70%	35			11%
15	45		50%	18			-
20	35		30%	-			-
25	30		15%	-			-
30	21		0%	-			-

*** Effect of enivronmental factors on the development and sporulation of the oocysts:**

Table (2) declares the sporulation percentages which were 90%, 80%, 30%, 11% and 0% in the presence of 70%, 63%, 50% 35% and 18% moisture content respectively. On consulting the data obtained, it could be indicated that, after 15 days exposure to our-door condition (sun-light and drying), all the oocysts within the faecal mass lost their vitality and failed to sporulate. Ellis (1938); Davis & Joyner (1955) and Ka-Oud (1985) found that 30°C-40°C at 40% or low moisture content in poultry droppings were lethal to *E. tenella* oocysts.

Comparatively, under in-door condition, the oocysts appeared more resistant and survived longer periods of time. The time of surviving depended on the loss of the moisture content and temperature of the faecal mass. However, the oocysts were destroyed completely when the moistur content of the faecal mass reached to 21%.

*** Effect of chemical agents on the development and sporulation of the oocysts:**

The data presented in (Table 3) declare that:

(1) Ammonia at a concentration of 5% destroyed 20% of the oocysts, while 100% of the oocysts were destroyed at 10%.

(2) Iodophore at a rate of 1:150 and 1:80 destroyed oocysts in a percent of 30 and 100% respectively.

(3) Bleaching powder at a rate of 3% failed to destroy any of the oocysts but it showed a slight effect at 5% concentration.

(4) Clacium hydroxide at 3% destroyed 25% of oocysts, but at 5% destroyed 55% of them.

Plate 1,A: E.arloingi (sporulated oocyst) X 200

Plate 1,B: E.ninakohlyakimovae (sporulated oocyst) X 200

Plate 1,C: E.faurei (sporulated oocyst) X 200

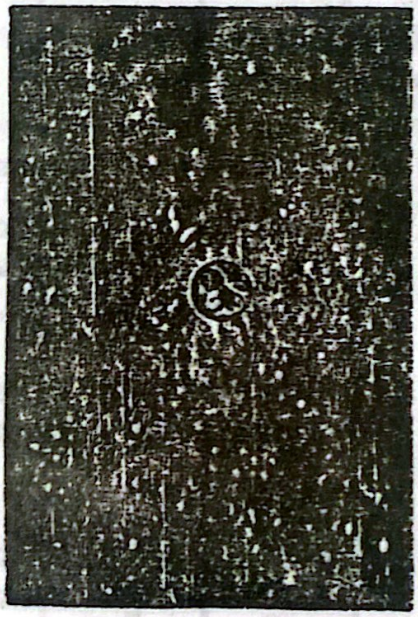

Plate 1,D: E.parva (sporulated oocyst) X 200

Table (3): Effect of chemical agents on the sporulation of E.oocysts (arloingi, ninakohlyakimovae, faurei and parva).

Chemical agent	Conc.	Ability to sporulation after 24 hrs exposure	Control
Ammonia	5 %	20	
Ammonia	10 %	0	
Iodophore	1:80	0	
Iodophore	1:150	30	
Bleaching powder	3 %	90	
Bleaching powder	5 %	70	
Ca. hydroxide	3 %	75	90 %
Ca. hydroxide	5 %	45	
Cresol	3 %	70	
Cresol	5 %	50	
Diazinon	0.1%	90	
Diazinon	1 %	90	
Ectomin	0.1%	90	
Ectomin	1 %	90	

(5) Cresol destroyed 30% of the oocysts at 3 and 5% concentration.

(6) Ectomin and Diazinon at a rate of 0.1% and 1% proved to be uneffective.

In conclusion, in order to minimize the risk of cocidial infestation in goats, oocystic stage should be destroyed outside thehost at breeding places with the application of hygienic measures. To achive this, Ammonia (10%) or Iodophore (1:80) can be safty sprayed on the breeding places of this protozoa, manure heaps, grazing areas and stagnant water as well as exposing them to direct sun-light.

SUMMARY

Faecal samples collected from the rectum of 4 Zariby kids (2 months of age) suffering of severe diarrhoea, were examined for Eimeria, Globidium and Cryptosporidia oocysts. the effect of temperature and dessication in sun-light and shade on the development of E. arloingi, E. ninakohlyakimovae, E. faurei and E. parva was studied. Some chemical agents were also used to study their effect on the sporulation of the oocysts.

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