COMPARATIVE EFFICACY OF APIPHYTOTHERAPY TOWARDS CHEMOTHERAPY IN CHICKEN EIMERIOSIS

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INTRODUCTION

- **The development of the apiphytotherapeutic products sector was accelerated in the last decades as a consequence of the requirements of veterinary therapy and the obtaining of organic food.**
- **Eimeriosis (*Eimeria spp*) is one of the avian parasite diseases which can take very serious forms, clinical and sub clinical, characterised by a digestive syndrome and slowing down the developing of the individuals and raising threshold of mortality (30-50% in acute forms).**
- **Presently, in the fight and prevention strategy for this disease, an important role is played by chemotherapy that actually is done with different products generic named coccidio-statics (eimerio-statics). Utilization of such synthetic products conducts to at least 2 disadvantages: the first is the chemo-resistance occurred by using them for a long period of time and the secondly is the possibility of residue accumulation in meat or eggs even if they are administered in a controlled manner.**
- **This situation has lead to finding out alternatives by using the natural therapeutic treatments in order to replace the conventional chemotherapy. The present study was done in the same direction, aiming to test the prophylactic and curative effect of an *apiphytotherapeutic product* in order to be used in the therapy of chickens with eimeriosis.**

MATERIAL AND METHODS

The researches - 2007 January-November, on 420 broilers of the bio base of veterinary Medicine Faculty -USAMVB. The young broilers - 12 days old, intensive „battery" system, 6 groups - experimental and control groups:

The apyphytotherapeutic product - based on propolis tincture and grape seed extract compared with the chemotherapy based on robenidine.

The treatment scheme applied on 6 broilers groups for the tested products.

Groups number/ Treatment	No. / group	The used product	Dose	Time interval
Group 1/ Prophylactic	70	Apiphytotherapeutic product	10 ml/l water	5 days prev. a.i.
Group 2 /Prophylactic	70	Robenidine	500 ppm (500 g/ tone of fodder)	5 days prev. a.i
Group 3 /Therapeutic	70	Apiphytotherapeutic product	20 ml/l water	5 days p.i.
Group 4 /Therapeutic	70	Robenidine	1000 ppm (1000 g/tone of fodder)	5 days p.i.
Group 5 / Control positive	70	infected/untreated	-	-
Group 6 / Control negative	70	uninfected/untreated	-	-

MATERIAL AND METHODS

*** The artificial infection was done by the administration of approximately 10.000 oocysts contained by a polyspecific suspension dose of *Eimeria* (*Eimeria tenella, E. acervulina, E. maxima, E. mitis*), the dose being divided for 2 administrations in 2 successively days (~5000 oocysts/broiler/day).**

*** The broilers were reared in intensive system, foddered *ad libitum* without any added substances of treatment than those used in this experiment.**

*** The chickens were weighed before and after experiment and the specific consume of fodder was calculated after the registration of daily consume.**

*** The chickens were followed up for the whole period of experiment - 21 days (12-33 days old)- for:**

- the general clinical status and evolution by daily clinical observations;
- the evolution of body weight gain, by weighing in the first and final day of experiments;
- the food consumption and conversion rate of food in the experimental groups;
- the establishing the faeces score;
- the dynamic of oocysts elimination by faeces;
- the necropsy exam and lesion score exam;
- the index and percentage of coccidiostatic performance.

MATERIAL AND METHODS

Faeces score:

0 – faeces with normal characteristics
1 – faeces with diarrhea characteristics
2 – faeces of chocolate –brown colour
3 – faeces with blood strips
4 – faeces with hemorrhagic characteristics.

The coccidiostatic index : Ic=Ms+Ps-X(MF+ML)

Ms = average of weight gain on time interval
Ps = survival percentage

1st day the is the beginning of the experiment (the 12th day of chicken's life)

X = the final day of the experiment (21)
MF = faeces score measured by specific methods
ML = lesions score

The percentage of the coccidiostatic performance :

$$PP = \frac{\text{coccidiostatic index in the infected and treated group}}{\text{coccidiostatic index in the uninfected and untreated group}} \times 100$$

RESULTS AND DISCUSSIONS

1. The clinical status:

- The clinical signs occurred in the 5-th day following the artificial infection in all groups and individuals, with characteristic symptoms: apathy, horiplumation, pallid mucous membranes in appearance, low appetite. Initially, the chicken showed a pronounced consumption of water, after this being slowed down. The faeces were initially whitish, subsequently being bloody, and after that brown-chocolate in colour.
- These symptoms were most obviously in the group 5 positive control, infected but untreated group. The general symptoms were diminished in the treated groups.
- In the groups were the tested products were curatively administered a significant reduction of clinical signs and mortality (18 individuals in group 3, 9 in the group 4) was registered comparative with the infected and untreated group (39 individuals in the group 5).

RESULTS AND DISCUSSIONS

2. Body weight evolution

Group No.	Initial number of chickens (n)	Period of time (days)	Survival number (n) / Rate (%)	Initial weight (g)		Final weight (g)		Body weight gain (g)	
				Total/ Group	Individual Average	Total/ Group	Individual Average	Total/ Group	Individual Average
1	70	21	70 (100%)	14245	203.5	48398	691.4	34153	487.9
2	70	21	70 (100%)	14098	201.4	48335	690.5	34237	489.1
3	70	21	52 (74%)	13552	193.6	31376	603.3	21304	409.7
4	70	21	61 (87%)	13930	198.9	41109	673.9	28975	475.0
5	70	21	31 (44,2%)	14075	201.0	15978	515.4	9948	330.1
6	70	21	70 (100%)	13811	197.3	49700	710.0	35889	512.7

RESULTS AND DISCUSSIONS

- Analysing the obtained data it is noticed that the greatest increase in body weight was registered in the negative control group 6 = uninfected, the individual average being 512.7 g.
- Analysing the infected groups the weight gain was greater in the groups treated preventively –the groups 1 and 2, with similar progresses (487.9 g respectively 489.1 g) than the others groups.
- In the groups were the products were used after artificial infection and after the occurrence of clinical signs there was registered a lower gain.
- The weight gain had lower values in the groups treated with the apiphytotherapeutical product (409.7 g), as compared with the robenidine product (475.0 g).
- The lowest values (330.1) were obtained in the positive control group (infected and untreated). The values were correlated also with a high mortality in the same group (55.71 %) which show a serious evolution of the disease.

RESULTS AND DISCUSSIONS

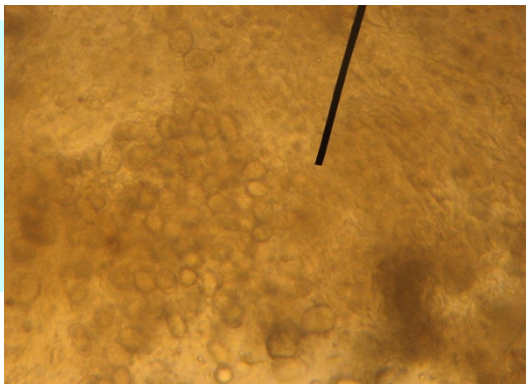
3. The food consumption and conversion rate of food

The best values regarding the conversion rate of food were registered in the groups were prevention treatments were administered. Out of these, the group 1 is obviously noted, where preventively was administered the apiphytotherapeutic product, the food consumption/kg weight gain (3.81) being slightly lower (4.1) than control negative infected group.

The food consumption and the conversion rate of food at the experimental and control groups

Groups	Weight gain (kg/group)	Period (days)	Food consumption (kg)	Food conversion (kg food/kg weight gain)
1	34.153	21	135	3.95
2	34.237	21	145	4.23
3	21.304	21	105	4.92
4	28.975	21	123	4.24
5	10.233	21	76	7.42
6	10.233	21	147	4.10

RESULTS AND DISCUSSIONS



4. The dynamic of oocysts (*Eimeria* spp) elimination by faeces and the faeces score

The values of elimination oocysts in faeces and the faeces scores in experimental groups

Groups	Values OPG (averages)	Faeces scores
1 2	51100 28170	1.75 1.30
3 4	114000 38700	2.10 1.60
5 6	312430 830	3.42 0.85

Limits of variation of the OPG and averages values of faeces score in experimental and control groups

Groups	Limits of values OPG	Average values of faeces score
Prophylactic treated groups (1-2)	19025 – 28170	1.75
Therapeutic treated groups (3-4)	42510 – 56780	2.17
Positive control group (5)	≤ 87275	3.42
Negative control group (6)	300 - 720	1.07

RESULTS AND DISCUSSIONS

5. The lesion score

The registered lesions were established at the level of midgut, cecum and cloacae which shown different aspects (catarrhal, hemorrhagic), receiving thus a specific score. By summing these scores obtained for the analysed anatomic organs it was established the total lesions scores for each chicken.

- **By analysing these results it can be highlight an important difference between the groups that were prophylactic treated and those therapeutically treated after artificial infection.**
- **Some differences were also noted between the infected and treated groups (preventive and curative) and the control groups - positive (infected/untreated) and negative (uninfected /untreated).**
- **The differences between these lesions were registered in conformity with the evolution of disease and clinical aspects as well as with the determined food conversion rate.**

RESULTS AND DISCUSSIONS

The lesion scores in the experimental and control groups

Score of lesions				
The groups	**Duodenum**	**Cecum**	**Cloacae**	**Total**
1 2	0.6 0.4	1.4 0.9	0.6 0.4	2.6 1.7
3 4	0.8 0.60	2.2 1.7	1.1 0.6	4.1 2.9
5 6	1.70 0.20	3.1 0.5	2.05 0.10	4.1 2.9

RESULTS AND DISCUSSIONS

6. The index and percentage of coccidiostatic performance

The averages of lesion scores registered for the experimental and control groups

Groups	Number of individuals		Period of experiment (days)	Weight gain (g)	Survival (%)	Faeces score	Lesion scores	Coccidio-static index	Coccidio-static Performance Percentage
	Initial	Final							
1 2	70 70	70 70	21 21	34153 34237	100 100	1.75 1.30	2.6 1.7	3423.95 3460.70	84.45 85.36
3 4	70 70	52 61	21 21	20485 28500	74.2 87.2	2.10 1.60	4.1 2.9	1989.70 2841.20	49.08 70.08
5 6	70 70	31 70	21 21	9948 35889	44.2 100	3.42 0.85	6.75 0.80	838.33 3654.25	20.67 100

RESULTS AND DISCUSSIONS

- The data analysis shows superior values of the 2 indicators in the prophylactic treated group. It can be noticed the group were the apiphytotherapeutic product was used as prophylactic treatment, were the last to indices - the coccidiostatic index as well as coccidiostatic performance percentage have superior values as compared with the rest of experimental groups and especially in robenidine treated group.
- Thus, these results are very strongly encouraging for using the apiphytotherapeutical product as alternative to the chemotherapeutic treatments in prophilaxy.
- In the groups were the tested products were used with therapeutic effects the obtained values for the determined indices (IC and PPC) are smaller in the groups where it was tested the natural product as compared with chemical product.
- Comparing these indices it can be noticed that the natural product is beneficial especially as a prophylactic measure.

CONCLUSIONS

1. The prophylactic administration of tested apiphytotherapeutical product have positively influenced in the evolution of the disease compared with that in the groups were it was administered as therapeutic treatment, after the clinical signs.
2. The body weight gain in the prophylactic groups was very significant increased comparative to that in the therapeutic and control groups.
3. The conversion rate of the prevention tested group with apiphytotherapeutical product was incontestably higher than all the other groups.
4. The level of copro-elimination of oocysts of *Eimeria spp* in the prophylactic groups was smaller than in treated groups and in positive control group.
5. The average values of faeces scores was significant lower in the both preventive treated groups as compared with those in the positive control group.
6. The registered mortality was 28.57% in apiphytotherapeutic treated group comparatively with 14.28% in chemical treated group and with 42.85% in the positive control group.
7. The lowest lesion score was noticed in the prophyilactic treated group with followed by the group prophyilactic treated with the natural apyphytotherapeutic product.
8. The obtained results highlight the qualities of the tested apiphytoherapeutical product especially as prophylactic treatment in the eimeriosis diseases.