THE 12TH INTERNATIONAL SYMPOSIUM

PROSPECTS FOR THE 3rd MILLENNIUM AGRICULTURE

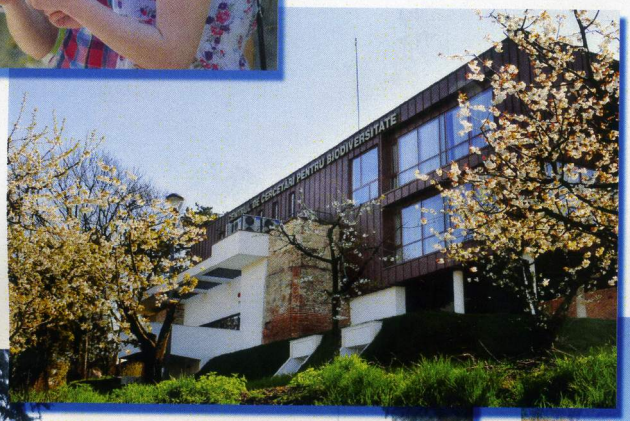
26th - 28th of September 2013, Cluj-Napoca, Romania



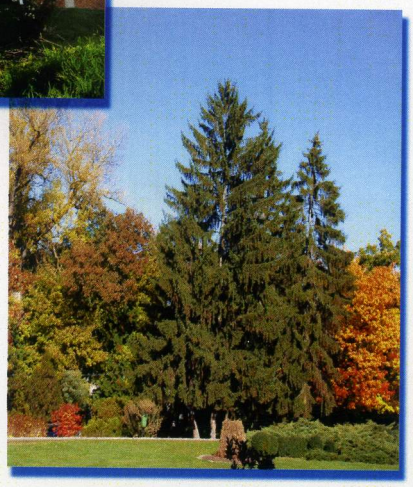


BOOK OF ABSTRACTS

VOLUME II







EFFICACY OF *ARTEMISIA ANNUA* AGAINST *EIMERIA* SPP. INFECTION IN BROILER CHICKENS IN A BATTERY TRIAL

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Keywords: *coccidiosis, Eimeria, poultry, Artemisia.*

Introduction: Coccidiosis is one of the most common and costly disease of poultry industry world-wide. Prevention of diseases is based on chemoprophylaxis with coccidiostats. There is an increasing interested to develop new strategies for coccidiosis control, and use of medicinal plants seems to be an alternative. *A. annua* was used in Chinese medicine for centuries and its main bioactive component, artemisinin, is very efficient against several stages of *Plasmodium.*

Aims: The goal of this study was to evaluate the efficacy of *A. annua* as essential oil in preventing *Eimeria* infection in broilers.

Materials and methods: Sixty broilers of fourteen days were randomly divided in 3 groups of 20 chickens as follows: negative control (NC) (uninfected, unmedicated), positive control (PC) (infected, unmedicated) and experimental group (EG) (infected, medicated). Experimental infection was done with $1x10^4$ oocysts of *Eimeria* spp. and treatment with 0.15 ml essential oil of *A. annua*/l water for 27 days. The chickens were kept in batteries, fed and watered ad libitum, and were exposed to continuous light. Essential oil of *A. annua* was obtained from a Romanian variety, poor in artemisinin, called ROMN 08, through a hydro-distillation process of plants vegetative parts, blooms and flowers. Concentration of artemisinin, deoxyartemisinin, dihydroartemisinic acid, and artemisinic acid were quantified by HPLC-UV analysis. Efficacy of *A. annua* against *Eimeria* spp. infection was evaluated by: (i) oocysts shedded per gram of feces; (ii) lesional score; (iii) body weight gain; (iv) feed conversion ratio; and (v) mortality rate.

Results: The inoculum used for experimental infection consisted in *E. tenella* 35.0%, *E. acervulina* 32.5%, *E. mitis* 25.0%, and *E. maxima* 7.5%. *A. annua* contained 0.2% artemisinin, 0.3% artemisinic acid, and deoxyartemisinin. All chicks survived in NC and EG, and in PC died 2 chickens, at 7 and 10 days after challenge. Chickens treated with essential oil of *A.annua* produced with 97.1% less oocysts than chickens from PC, while the mean lesion score was lower only with 35.3% (EG = 0.86; PC = 1.33). Following the intestinal segment the highest reduction of lesion score in EG was registered in duodenum (1, and 2 in PC) and caeca (0.4, and 1 in PC), while in the jejunum was higher than in PC (1.2, and 1 in PC). Body weight gain and feed conversion ratio were higher in chickens medicated with *A. annua* and in chickens from NC at 7 days post-infection, but at 27 days post-infection chickens from PC presented a higher body weight gain and a lower feed conversion ratio.

Conclusion: According to our results, *A. annua* ROMN 08 as essential oil can be used with good results to treat coccidiosis mainly caused by *E. tenella* and *E. acervulina* in chickens, and not for prevention. Essential oil of *A. annua* ROMN 08 had no effect against *E. maxima,* according to lesion score in the jejunum. Further analysis must be done.

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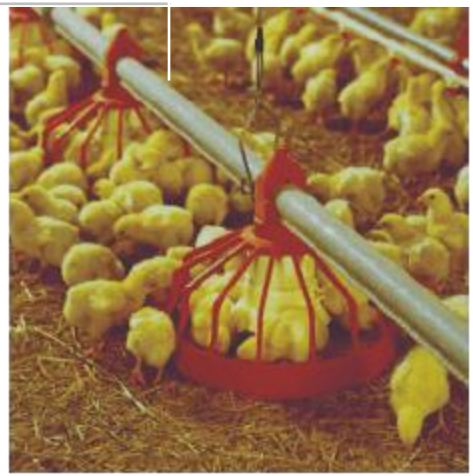
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Efficacy Of *Artemisia Annua* Against *Eimeria* Spp. Infection In Broiler Chickens In A Battery Trial

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Introduction



- coccidiosis one of the most costly disease
- prevention based on chemoprophylaxis with anticoccidials
- develop new strategies for coccidiosis control



- *A. annua* - Chinese medicine
- artemisinin - very efficient against *Plasmodium*
- efficient also on *Babesia equi,* trypanosomes, cutaneous leishmaniosis



Aims

- The goal of this study was to evaluate the efficacy of *A. annua* as essential oil in preventing *Eimeria* infection in broilers
- We investigated the anticoccidial effects of *A. annua* as essential oil in broilers kept in batteries.



Materials and methods

Animals and *Artemisia* product

- 60 broilers one day-old
- essential oil of *A. annua* obtained from a Romanian variety through hydro-distillation process



Parasites

- a suspension of mixed *Eimeria* species (field isolate)
- species were identified based on morphology of sporulated oocysts



Materials and methods

Experimental design

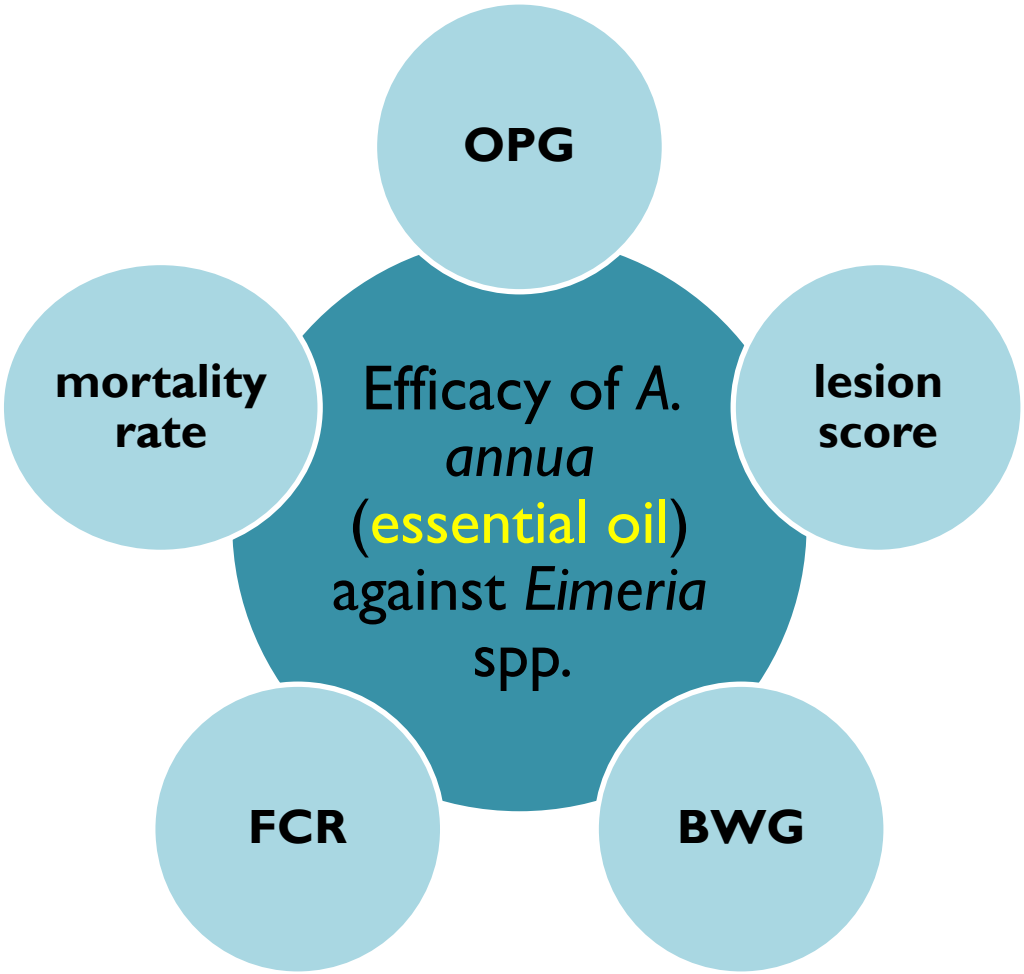
- chickens kept in batteries, feed and water *ad libitum*, continuous light
- fed with starter feed without anticoccidials until the date of the experiment
- 3 groups of 20 chickens (13-days-old)

Experimental groups	1X10^4 oocysts of *Eimeria* spp.	*A. annua* essential oil
NC (negative control)	-	-
PC (positive control)	+	-
EG (experimental group)	+	+

- *A. annua* essential oil - 0.15 ml/l water - the entire period of the experiment (27 days pi)



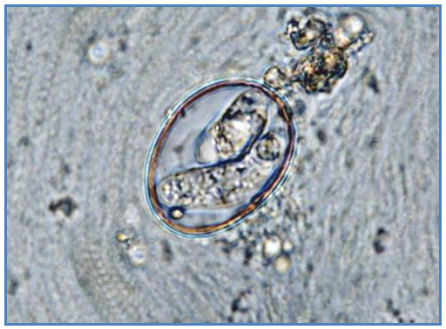
Materials and methods



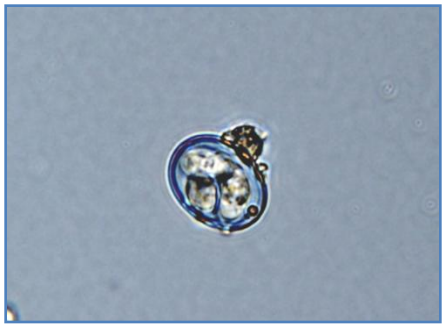


Results

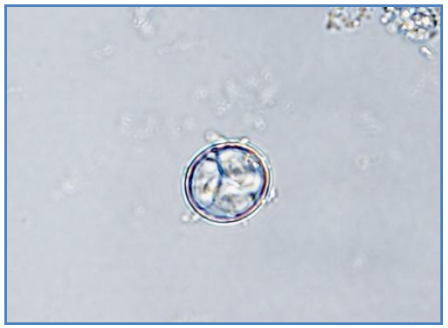
Eimeria species



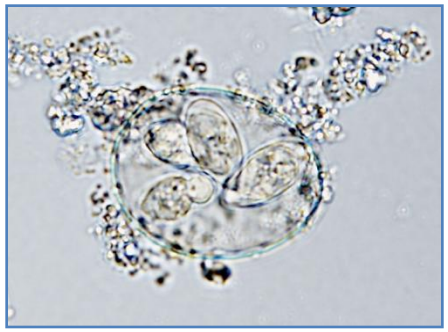
E. tenella (x 400)



E. acervulina (x 400)



E. mitis (x 400)

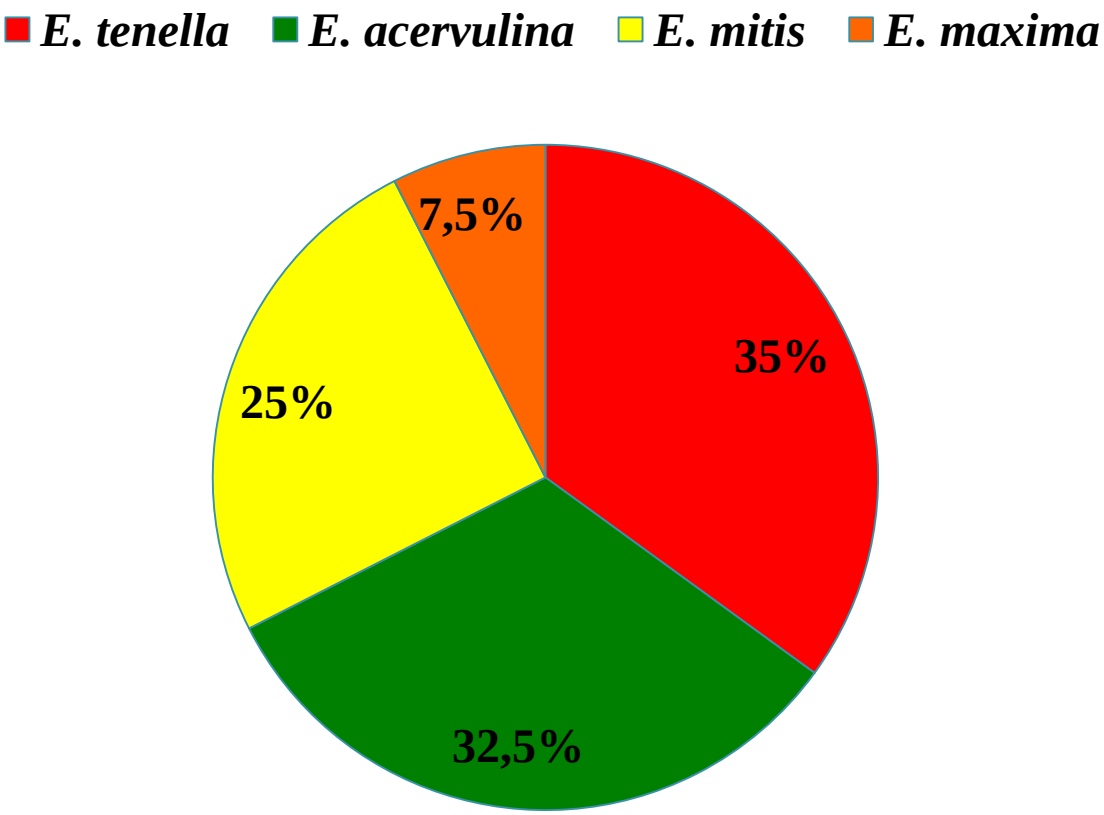


E. maxima (x 400)



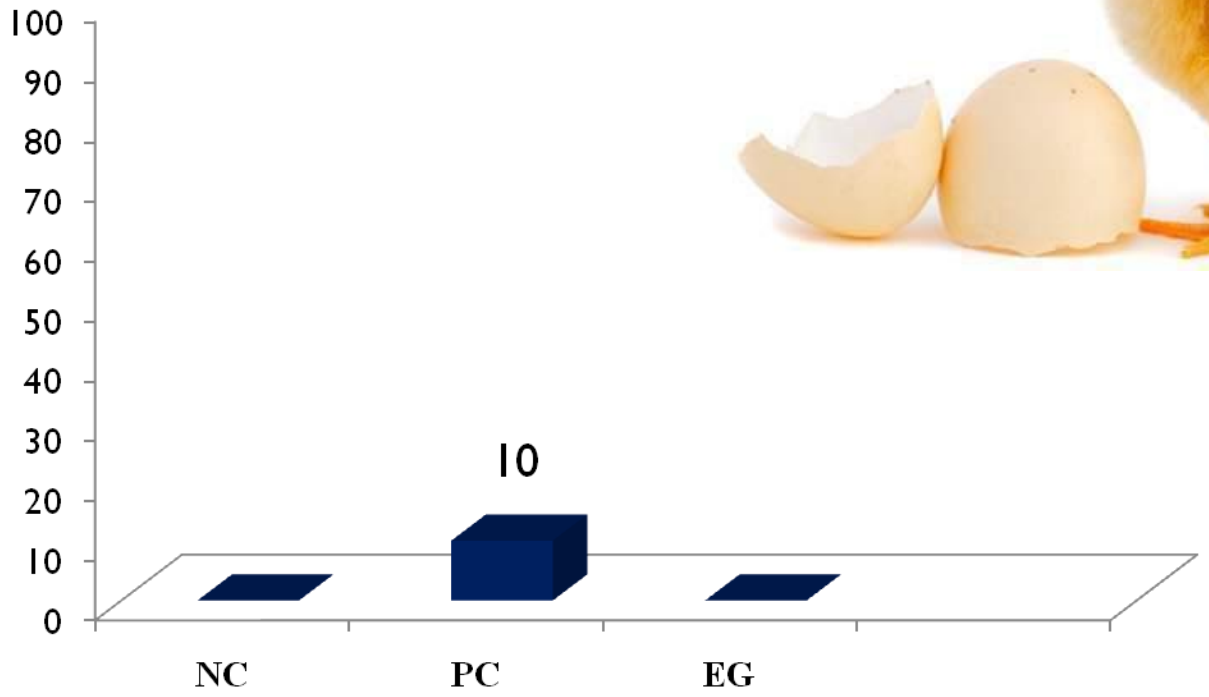
Results

Eimeria species



Results

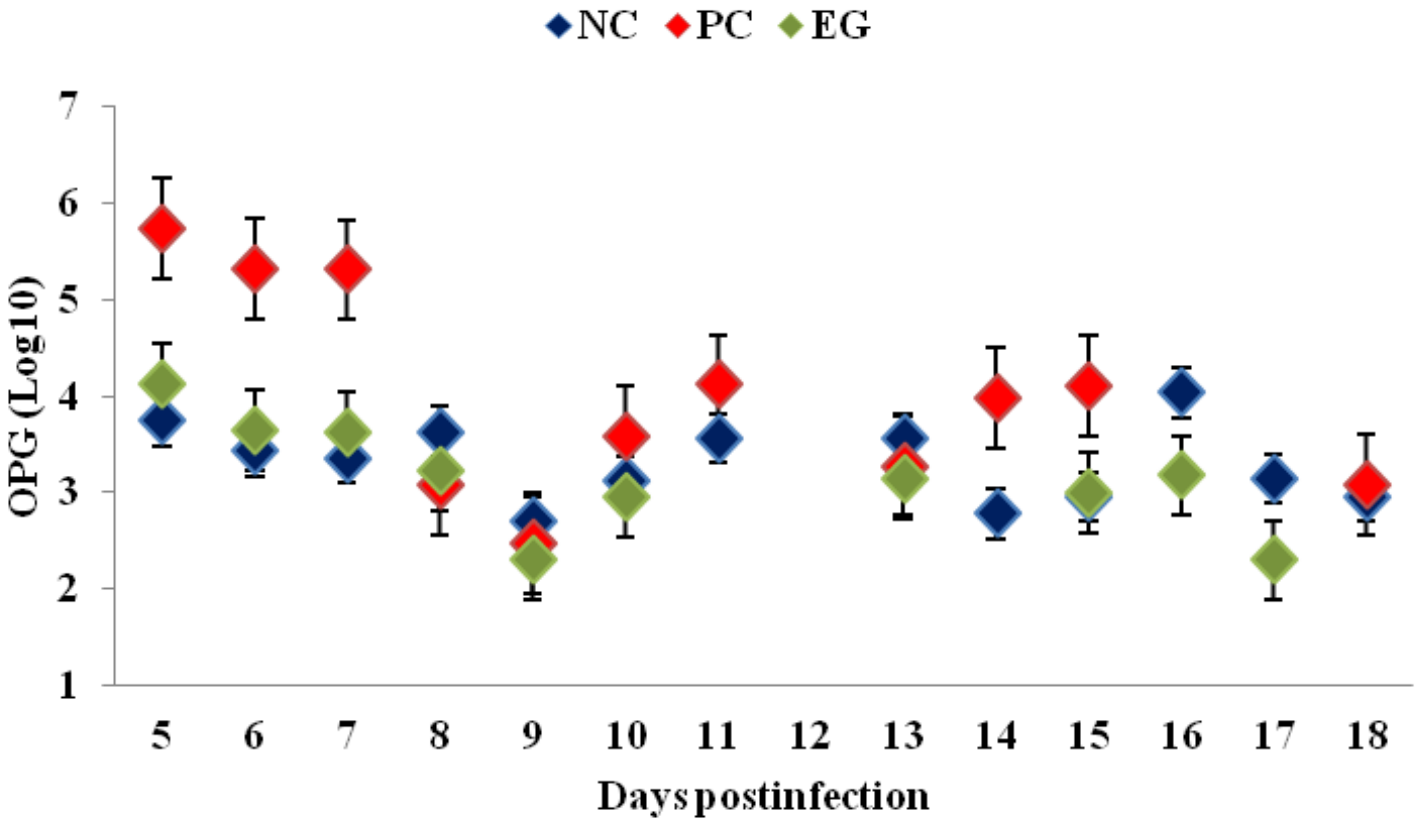






Results

OPG

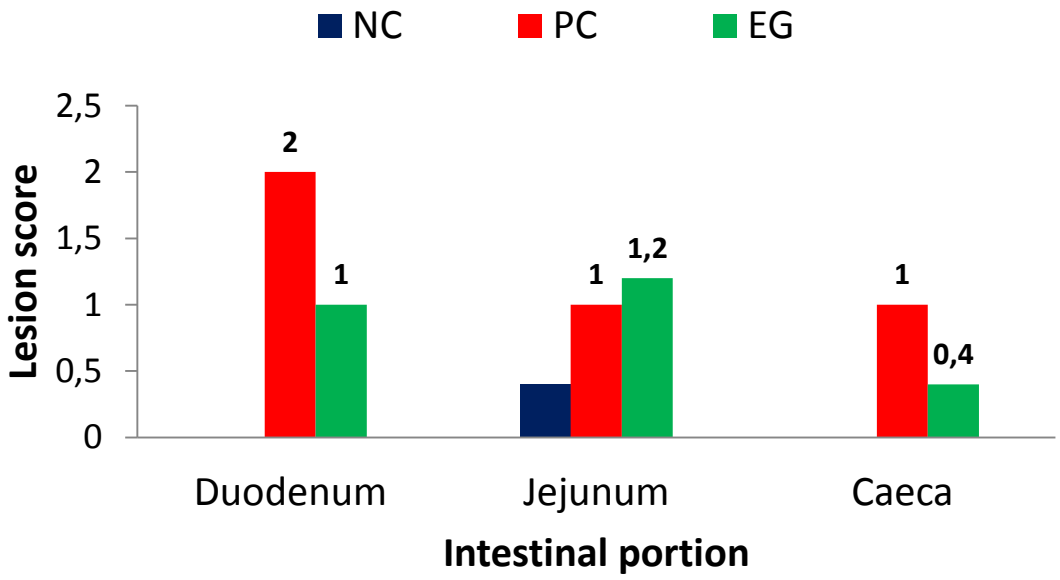

NC
PC
EG
OPG (Log10)
7
6
5
4
3
2
1
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Days postinfection

Results

Lesion score



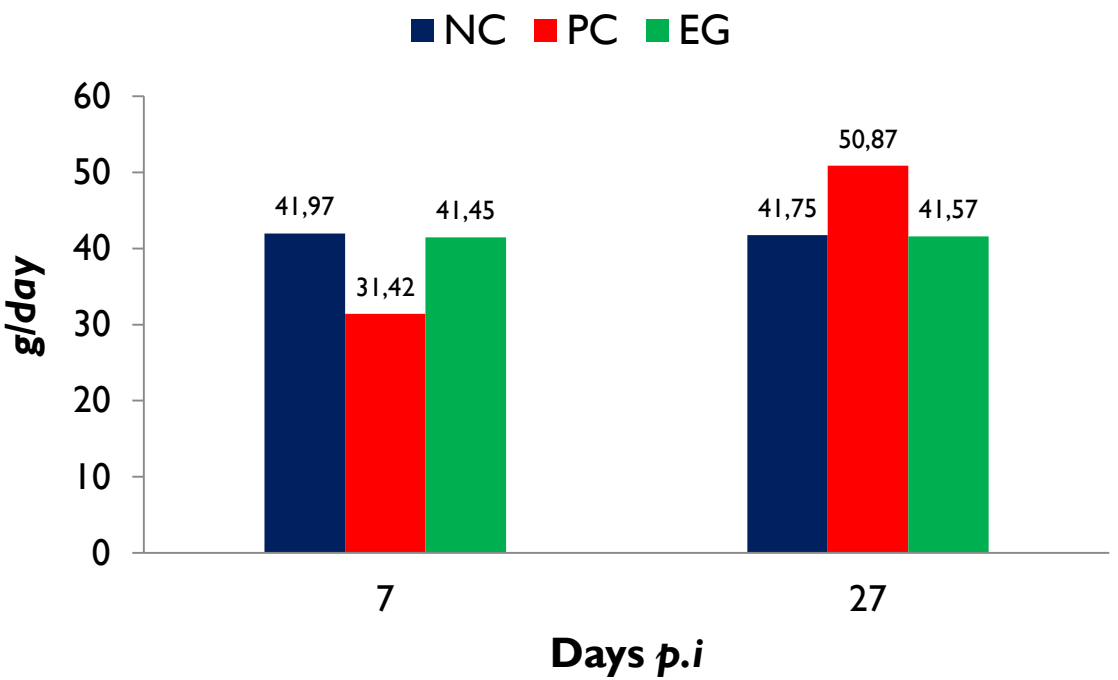






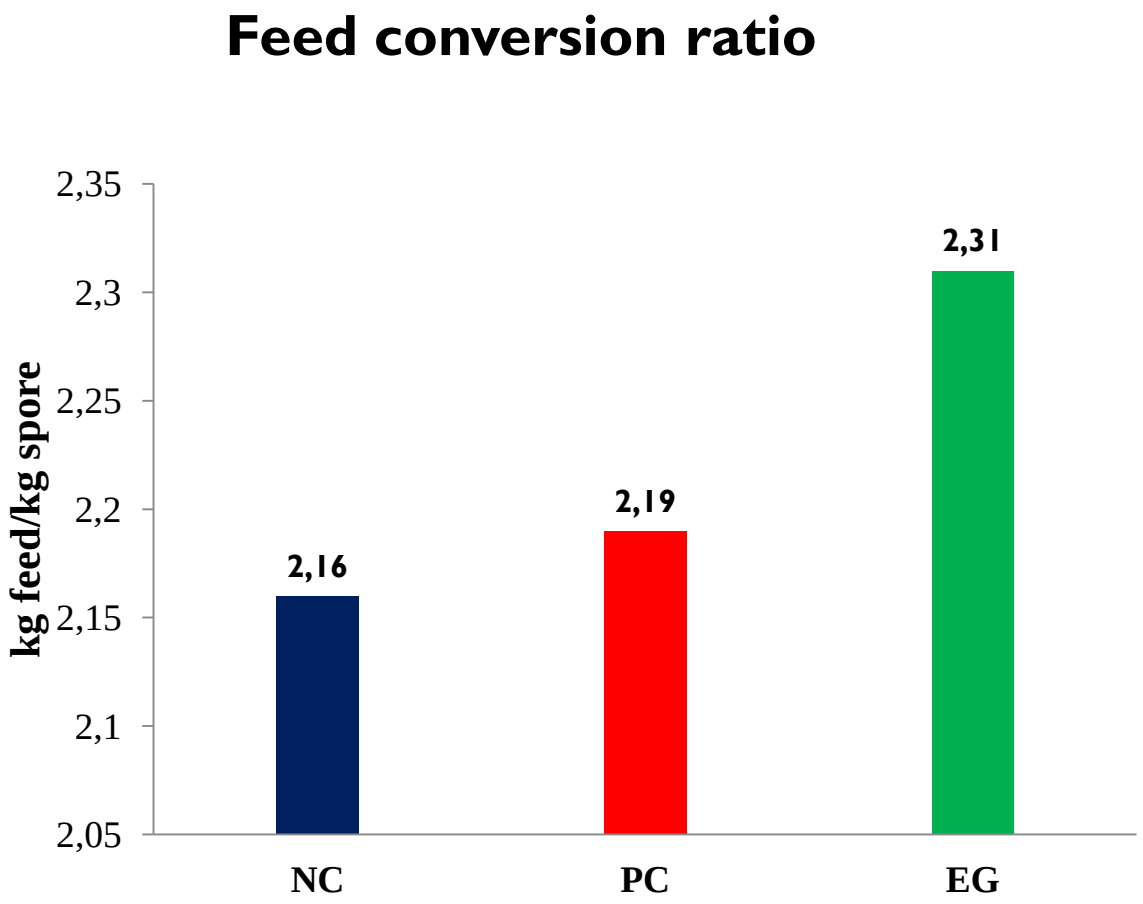
Results

Body weight gain





Results


Feed conversion ratio
kg feed/kg spore
2,35
2,3
2,25
2,2
2,15
2,1
2,05
2,16
2,19
2,31
NC
PC
EG



Conclusions

- *A. annua* Romanian variety as essential oil can be used with good results to treat coccidiosis mainly caused by *E. tenella* and *E. acervulina* in chickens, and not for prevention.
- Essential oil of *A. annua* Romanian variety had no effect against *E. maxima*, according to lesion score in the jejunum. Further analysis must be done.



Thank you for your attention !