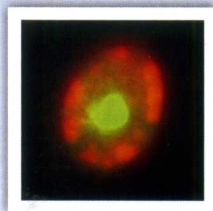


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Artemisinin has low efficacy against experimental infection with *Eimeria* spp. in broiler chickens

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In this study we aimed to evaluate the efficacy of artemisinin, the main bioactive compound of *Artemisia annua*, in preventing coccidiosis in broiler chickens. For this purpose, twelve days-old broilers were randomly divided in six groups of 21 chickens, as follows: negative control group (NC) (uninfected, unmedicated); positive control group (PC) (infected, unmedicated); three groups infected and medicated with 5, 50 and respectively 500 ppm artemisinin (ART 5; ART 50; ART 500) and a group infected and medicated with 125 ppm monensin (MON). The experimental feed for each group was introduced two days prior challenge. The chickens were kept in batteries, fed and watered *ad libitum*, and light was continuous. Experimental infection was performed at the age of 14 days with a suspension containing 3.2×10^4 *Eimeria* spp. oocysts (*E. acervulina* 20,000, *E. maxima* 10,000 and *E. tenella* 2,000). The efficacy of artemisinin against *Eimeria* spp. was evaluated by recording weight gain (WG), feed conversion ratio (FCR), oocysts shedded per gram of feces (OPG) and lesion score. WG was higher in ART 50 group than in ART 5 and ART 500 groups, but was lower compared to the control groups. On the other hand ART 5 group had a better FCR comparing with the other experimental groups, as well as the NC group. OPG was significantly lower in chickens treated with artemisinin, compared with PC group. The highest reduction was noticed in ART 500 group at 5 days postinfection, but the ART 50 group showed a higher reduction at 7-10 days postinfection compared with ART 5 and 500 groups. The lesion score was significantly lower in the duodenum in ART 5 group, whilst in the jejunum and caecum it was lower in ART 500 group. In ART 50 group the lesion score was unaccountable greater than in PC group. Artemisinin had significantly reduced the OPG as against the positive control group, although contradictory data were obtained in the lesion score, data which are not correlated with OPG, WG and FCR. Nevertheless, we conclude that artemisinin, in the described dosage, had low efficacy against *Eimeria* spp.

Aknowledgements: This work was supported by UEFISCDI, project number PN II-PCCA Tip 2 110/2012.



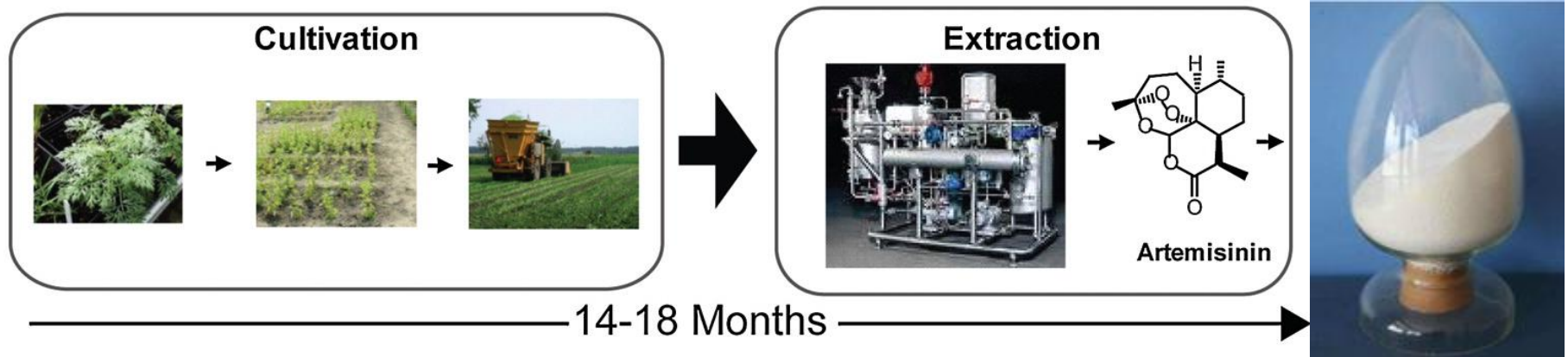
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Artemisinin



Applications

- ✓ Viruses (Khan et al, 1991)
- ✓ Bacteria (Juteau et al, 2002)
- ✓ Colon cancer (Blazquez, 2013)
- ✓ Breast cancer (Tin et al, 2012)
- ✓ Gastric cancer (Zhang et al, 2014)
- ✓ Leukemia (Lai&Singh, 1995)



Malaria

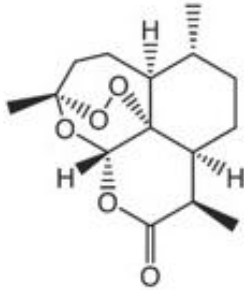


ACTs

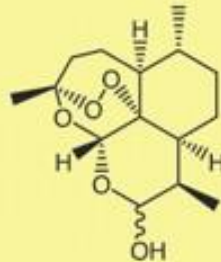
Artemisinin based
combination therapies



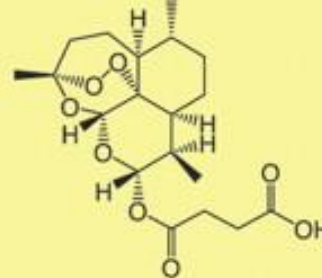
Efficacy against other parasites



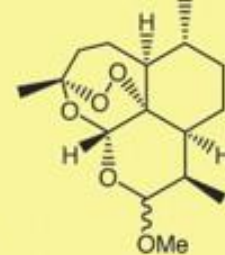
Artemisinin



Dihydroartemisinin



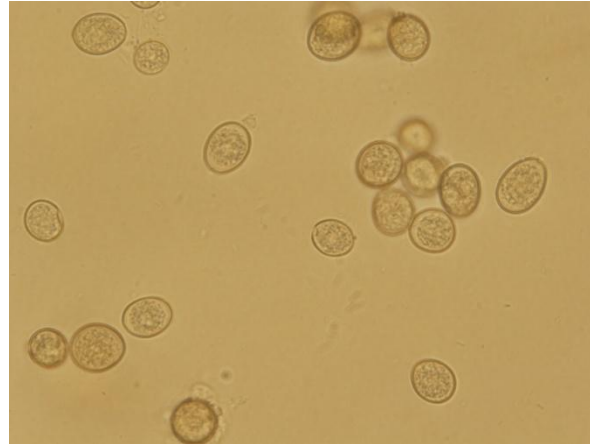
Artesunate



Artemether

- *Leishmania donovani* (Yang & Liew, 1993)
- *Toxoplasma gondii* (Ke et al, 1990)
- *Neospora caninum* (Kim et al, 2002)
- *Theileria equi* (Kumar et al, 2003)
- *Fasciola hepatica* (Keiser et al, 2008)

Chicken coccidiosis



E. tenella ✓

E. acervulina ✓

E. acervulina + *E. tenella* ✓ (Allen et al, 1997)

E. maxima ✗ (Arab et al, 2006)

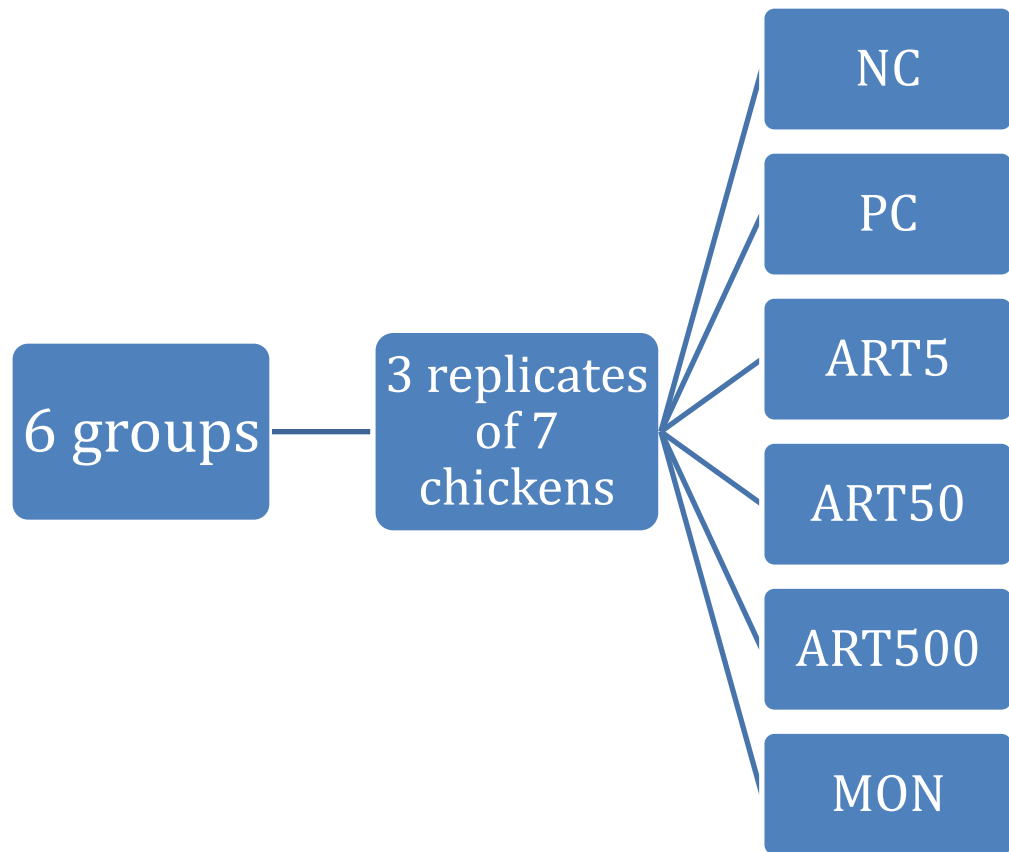
oocyst sporulation (del Cacho, 2010)



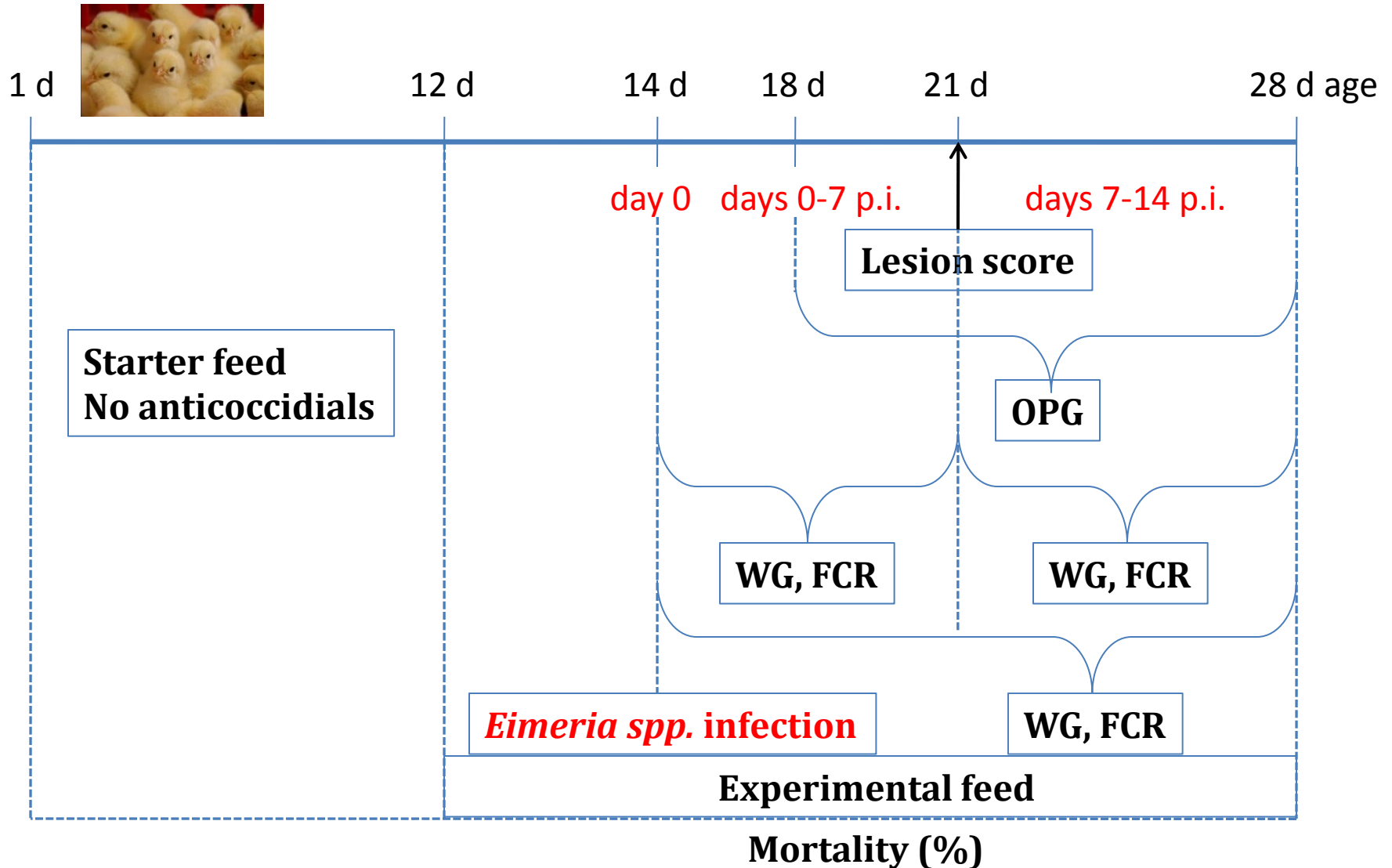
Materials and methods

- The goal of this study was to evaluate the efficacy of artemisinin in experimental *Eimeria* infection in broiler chickens

Ross 308



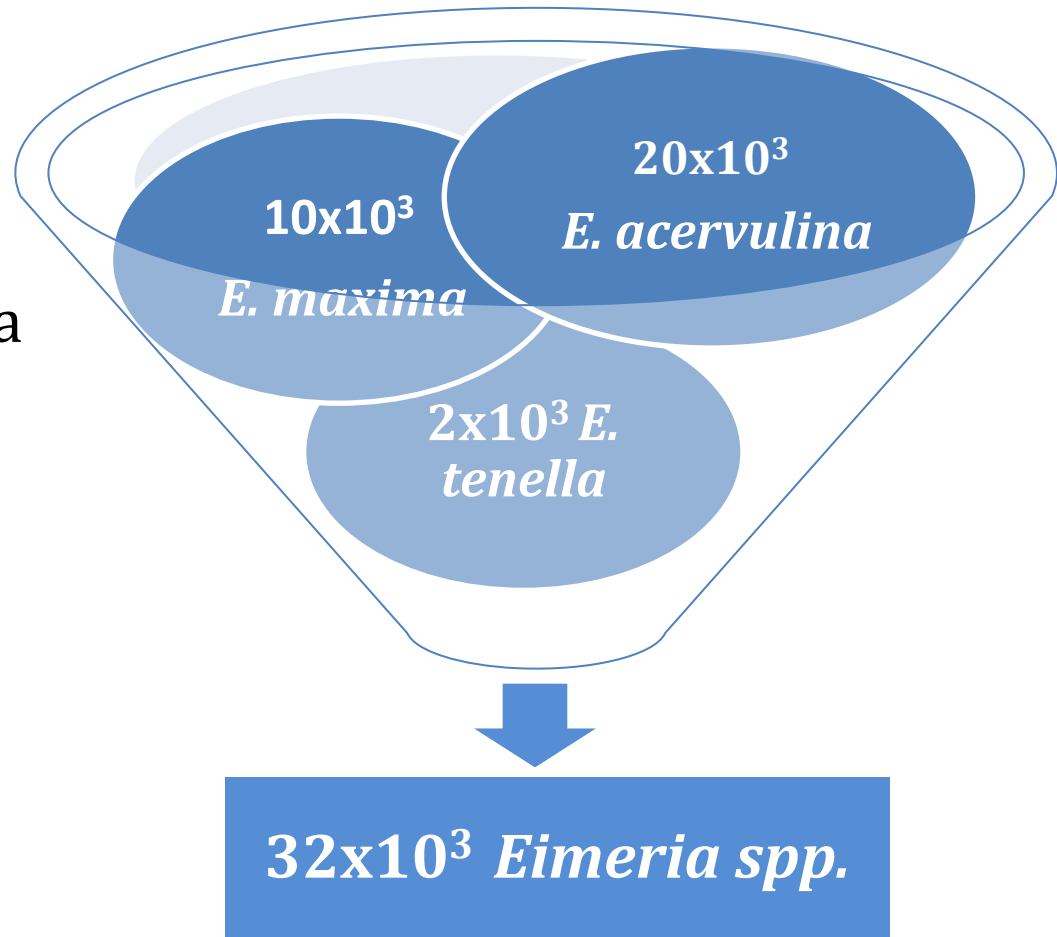
Materials and methods



Materials and methods

Experimental infection

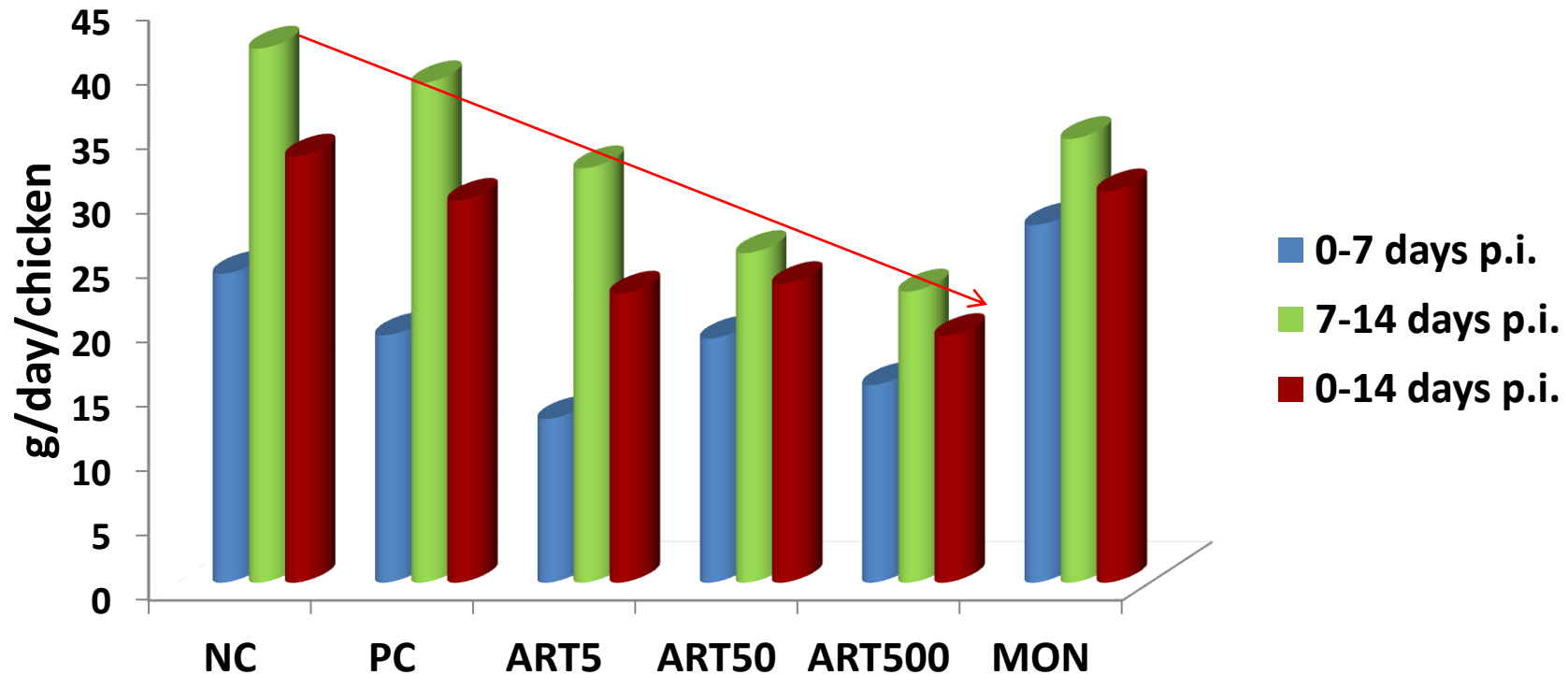
- age 14 days
- Houghton strains of *Eimeria*
- water and feed *ad libitum*
- lighting program 24 hours



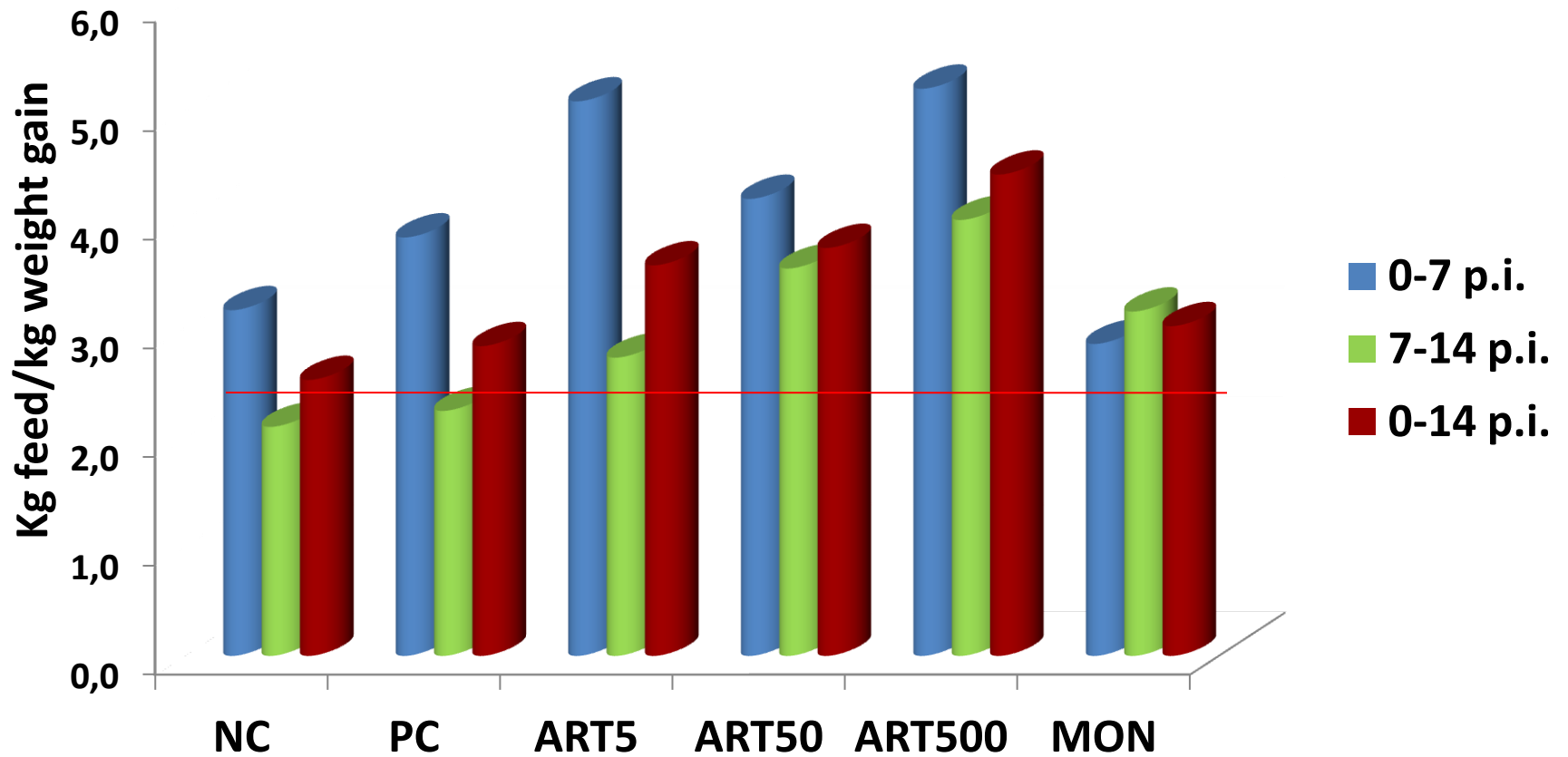
Results

Mortality (%) = 0

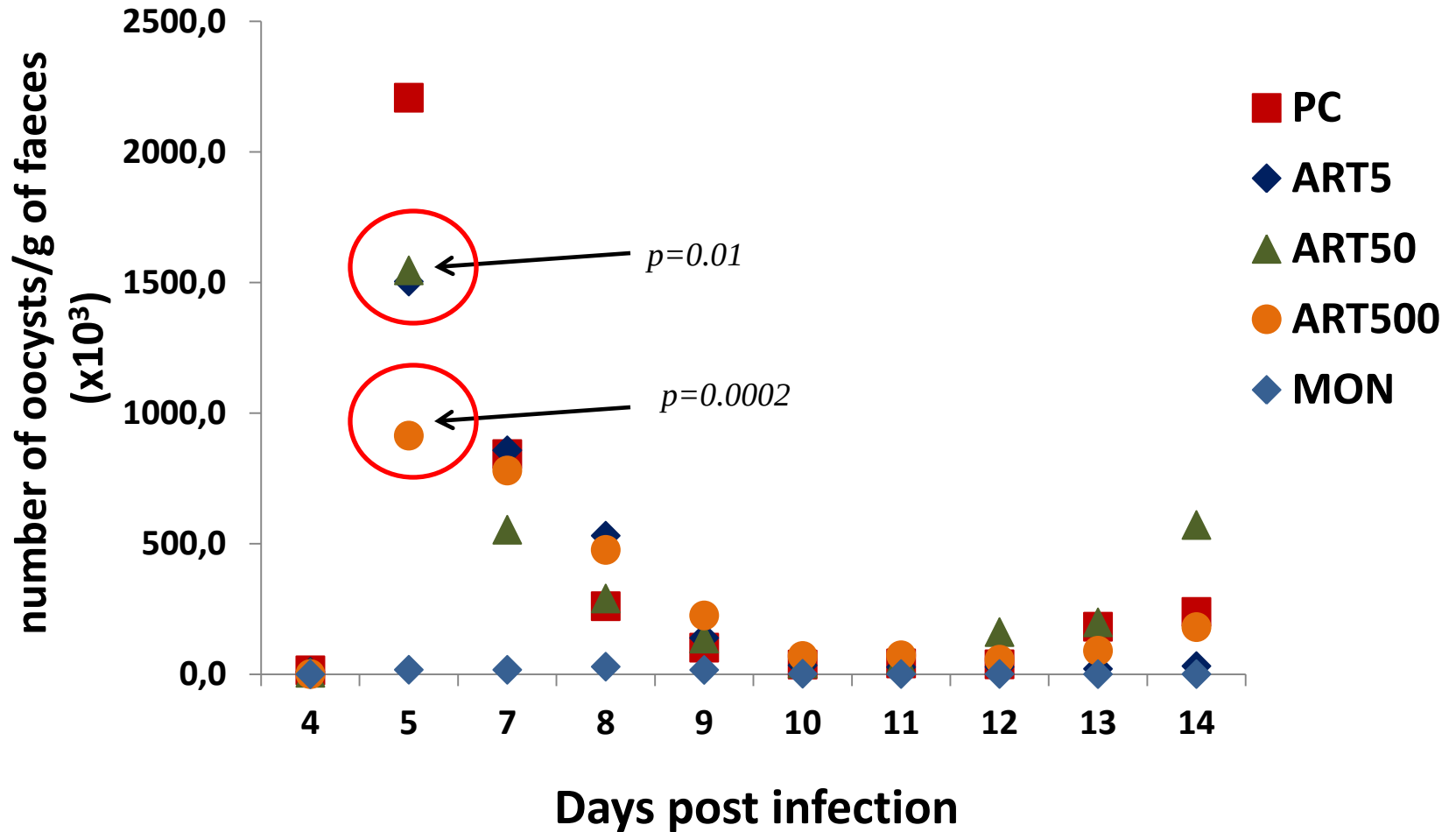
Body weight gain



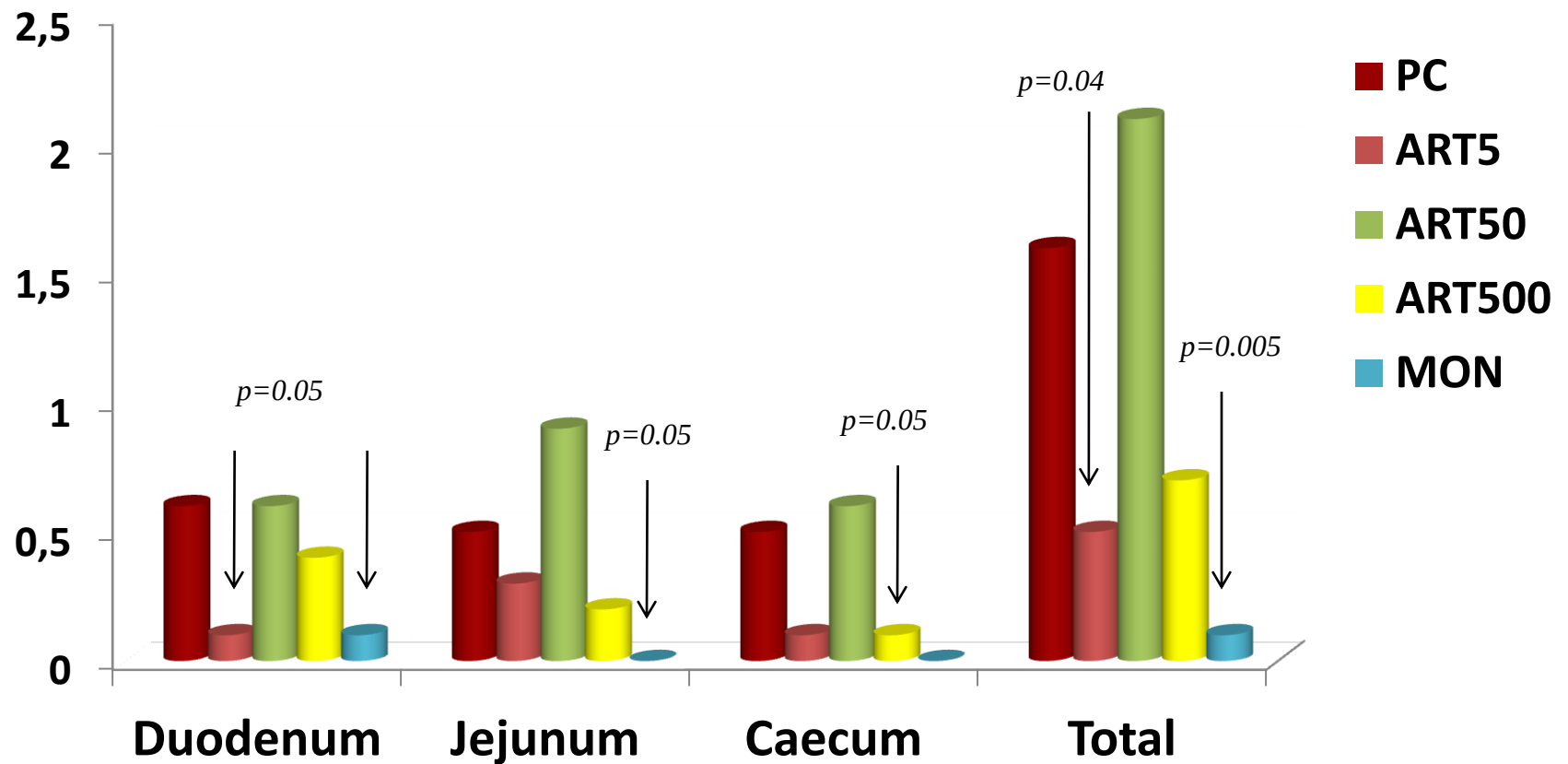
Feed conversion ratio



OPG



Lesion score



Conclusions

- Artemisinin had significantly reduced the OPG ;
- The intestinal lesions were reduced only by concentrations of 5 and 500 ppm of artemisinin;
- Contradictory data were recorded for the BWG and FCR

➤ Artemisinin, in the described dosages, had low efficacy against *Eimeria* spp.