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Protective effects of artemisinin and *Artemisia annua* extracts on clinical caecal coccidiosis in broiler chickens

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Conclusions

- Artemisinin has a positive effect on the course of caecal clinical coccidiosis in broilers, seen as a reduced severity of the lesion.
- The results suggests that artemisinin has an immunomodulatory effect.
- Artemisinin should be investigated further for its potential role as a substitute for the commonly used coccidiostats in the broiler production.

Background

Avian coccidiosis is the most important parasitic disease in poultry production. Intense use of anticoccidials increases the risk of resistance development against these drugs. Combined with increased consumer concerns and a trend towards organic and free range production, the demand for research in the use of natural compounds as an alternative to anticoccidials has increased.

Aim

The aim was investigate the protective effect of artemisinin and a dichloromethane extract from *Artemisia annua* in single infection with *Eimeria tenella* (Houghton strain) in broilers.

Materials and methods

- Artemisinin and dichloromethane extract from dried leaves of *A. annua*
  - Supplemented in the feed to broilers from day 7 of age
  - Artemisinin 100 ppm (Art-100)
  - Dichloromethane extract of *A. annua* 200 and 300 ppm (Ext-200, Ext-300)
- Inoculation with 4000 *E. tenella* (Houghton strain, Isolate K-347-1) at 16 days of age
- Lesion scoring on 5 and 7 days post infection (dpi) as described by Johnson & Reid (1970).
- Determination of oocyst output in caecal content (McMaster method)

Results

- Artemisinin has significant protective effect on the severity of the acute caecal lesions caused by *E. tenella* 5 dpi.
- Gross lesions in chickens treated with artemisinin appeared more healed on day 7 post infection compared to untreated infected birds with similar lesion score.
- No differences in oocyst output were observed.

Discussion

- Artemisinin was demonstrated to have a significant protective effect on the severity of the acute caecal lesions 5 dpi.
  - This in line with previous reports on the effect of artemisinin on *Eimeria* infections in chickens (Allen et al. 1997, del Cacho et al. 2010)
  - This is the first study evaluating the effect of a dichloromethane extract from *A. annua* and as seen in the figure above, there seems to be a dose dependant correlation with severity of lesions.
  - The observations on day 7 is suggestive of an immunomodulatory effect of artemisinin.
  - Histological investigations of the lymphocytic response in the caeca are on-going.
- Further research is needed to fully clarify artemisinin and its derivatives as a potential coccidiostatic candidate.

Key words: *Eimeria tenella*, artemisinin, broilers

References


del Cacho et al., 2010. Effect of artemisinin on oocyst wall formation and sporulation during *Eimeria tenella* infection. Parasitol. Int. 59, 506-511.

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