

Comparsion Between Anti Coccidial Effectes of Artemisia Siberi Extract and Apacox Copmplex and Lasalosisd in Experimental Infected Broilers with Coccidiosis

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ABSTRACT

Increasing resistance against conventional anticoccidial drugs and consequence of their residues has paid the attention toward more effective and safe compounds. Artemisia plant and the apacox complex are potential candidates that their anticoccidial effects has been previously discusse: This study aimed to determin an appropriate dosage from the extract of Artemisia siberi and evaluate its anticoccidial effects compared to apacox complex and lasalosisd drug. Artemisinin extract was extracted from Artemisia siberi by petroleum ether the apacox complex and lasalosisd bought from the pharmacy by our order. 105 chicks were divided in to 7 group tree replicates each (n=15). artemisia extract in two dosages 0/5 and 1/5 mg/kg for group A & B and the apacox complex in two dosages 0/5 and 1/5 gr/kg for group C&D and lasalosisd in 75 mg/kg were used for the E group of broilers from the first day as feed additive . infected group(F) and non infected group(G) didn't recive any medication . Experimental coccidiosis was induced in chicks by oral administration of 100000 oocysts/chick on 14th day . fecal samples of each group were collected for 5 days from 15th day until 19th day and the OPG (oocyst per gram) was determined as anticoccidial index. Artemisia and apacox complex significantly decreased OPG value in treated group although it was lower than lasalosisd group . artemisia extract in 1/5 mg/kg had stronger power than apacox in its two dosage and Artemisia in 0/5 mg/kg .this means Artemisia have dependent dosage effect in dosage lower than 1/5 mg/kg. This study showed that the Artemisia siberi extract can be considered as a new effective and safe anticoccidial drug although it is weaker than lasalosisd

Key word: Coccidiosis, Artemisia ciberi, Lasalosisd, Apacox complex.

INTRODUCTION

Coccidiosis is the most is the *common parasitic disease of poultry that its economic damage is considerable* due to its global dissemination and almost constant presence in poultry farms. It must be understood that economic damage of the disease is not only mortality caused by it, but also it is in fact the most important factor in growth reduction, body weight reduction and

Increased feed conversion ratio^{1,2,3,5,6}. In a simple calculation, economic losses over 1 billion dollars and mortality of approximately 6-7% are of the complications of this disease in the United States of America. Although useful drugs against coccidiosis has been marketed since 1940^{7,11,12,13,22,23}, the incidence of drug resistance and the presence of drug residues in chicken meats have drawn attentions to the use of safe practices^{4,8,20,21}. In the second step, vaccines are not also

accepted due to the high cost and not covering all pathogenic species. One of the ways that has been very much accepted nowadays is to use herbal compounds and their active ingredients to treat the disease. Because, on the one hand, these compounds are very cheap and available and on the other hand, no resistance to molecules contained within them will not happen. In this paper, we investigate the effect of two herbal compounds, *Artemisia Siberi* and the herbal complex of Apaco, against coccidiosis and then compare the two with each other and with a known drug compound, called lasalosis^{9, 10, 13}.

Artemisia Siberi is a plant used in traditional Chinese medicine as an anti-malarial treatment for many years, particularly for drug resistant malaria and cerebral malaria. Arab in 2006 demonstrated that active ingredient in native species of *Artemisia Siberi* in Iran contains Artemisinin active ingredient and then measured and showed its effects. In later years, the anti-coccidial effects of Artemisinin active ingredient against coccidial was shown and even in 2008, the dose of $2.5 \frac{mg}{kg}$ of *Artemisia Siberi* extract was introduced very impressive against coccidiosis^{15,16}.

Herbal Complex of apacox is an herbal compound containing extracts from 4 following plants that is available under the brand name of Apacox as liquid. Plants used in the complex include:

- 1- Agrimoria – eupatoria
- 2- Echinacea – angustifolia
- 3- Ribes – nigrum
- 4- Cinchona – Succirubra

Anti-coccidial effects of this herbal complex have been demonstrated in various articles^{31, 32, 33, 34, 35}. This paper specifies the effect of these two groups of herbal medicines and lasalosis drug with each other by examining the number of oocysts excreted from per gram of feces.

MATERIALS AND METHODS

Animals and their maintenance

105 1-day-old Ross broiler chickens were prepared and in the same day, they were divided into seven 15-membered groups and each group,

three 5-membered repeats. Chickens' location was perfectly clean and free from any infection. Artificial light was available in a total of 24 hours. Ventilation was maintained on an ongoing basis. Temperature was about 32 °C during the first week and reduced about 3 °C every week until the end of the course^{17,18, 19}.

Diet

Water was completely available and diet was also completely available based on AOAC protocol^{24,14}.

Preparation of *Artemisia Siberi* extract

To prepare the *Artemisia Siberi* extract, at first aerial parts of the plant were collected and ground after drying at 28°C and the obtained powder was maintained at room temperature for next steps. Petroleum ether solution was used to extract the powder. First, 2.5 g *Artemisia Siberi* powder was solved in 200ml petroleum - ether and then heated for 6 hours at 30-50°C in Soxhlet device. The resulting extract was then passed through a filter paper and converted into a dried powder by evaporation device. The dried powder is an extract of *Artemisia Siberi* and contains Artemisinin active ingredient that has a low solubility in water and alcohol, but it is suspended in distilled water and given to the chickens of groups A and B with a dose of $0.5 \frac{mg}{kg}$ and 1.5 from the first day²⁵.

Preparation of apacox herbal complex extract

The mentioned herbal complex, which is made in liquid form and at a concentration of 100 , is prepared and given to the chickens of groups C and D with a dose of 0.5 and 1.5 from the first day.

Preparation of Lasalosis drugs

Lasalosis drug is also prepared and given to the chickens of group E with an effective dose of from the first. Group F is patients without treatment and group G is the control.

How and when chickens are infected

Of 7 chickens prepared, 6 groups should be experimentally infected with coccidiosis. For this purpose, a suspension containing *E. Tenella* oocysts fully sporulated in 2.5% potassium dichromate solution at 3-5 °C with sufficient Pathogenicity became available a 100.000 oocysts per ml suspension. 6 groups of chickens were infected from

14th day through giving 1ml suspension containing *E.Tenella* oocysts by *gavage*. The control group was treated with 1^{cc} distilled water.

Evaluation of parameters

After infection of 14th day, the treatment continued and then from the 20th to 24th day, the feces of each group was collected over 24 hours and studied to determine the number of oocysts per gram of feces excreted by McMaster method^{26,27,28,29,30}.

Data Analysis

The study was conducted in a completely randomized form with 7 groups, and each with three 5-membered repeats. 2 patient groups of A and B with **Artemisia Siberi** from the first day, 2 patient

groups of C and D with apocox from the first day, patient group of E with lasalosid drug from first day, and finally patient group of F and healthy group of E were examined in terms of mean oocyst shedding in each group in 20-24th day with significance of $p < 0.05$.

RESULTS

After the survey conducted, the results are as follows. Artemisia Siberi extract, Apacox herbal complex and Lasalosid Drug obviously significantly reduce the number of oocysts per gram of feces. The effect of Artemisia Siberi extract at a dose of 0.5 and comparing with the positive control group F is obvious in Fig. 1 that shows significant reducing effects. The effect of Artemisia Siberi extract at a

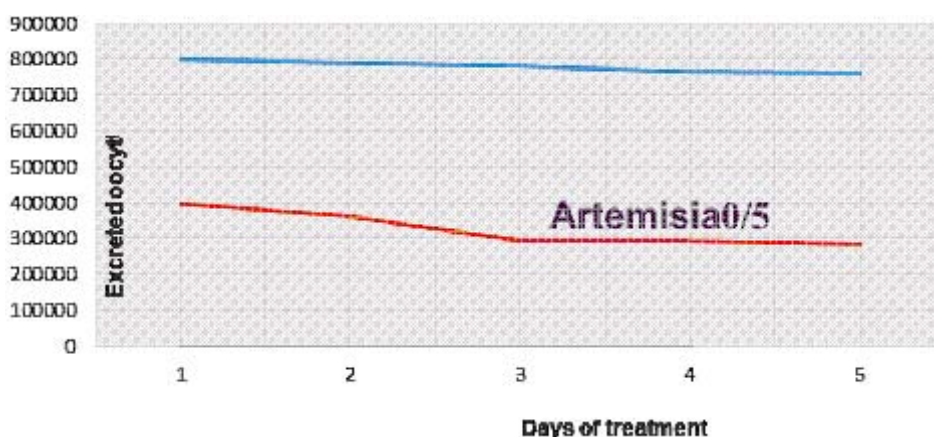


Fig. 1: The effects of Artemisia Siberi extract at a dose of $0.5 \frac{mg}{kg}$ and comparing with the positive control group F is obvious in Fig. 1 that shows significant reducing effects

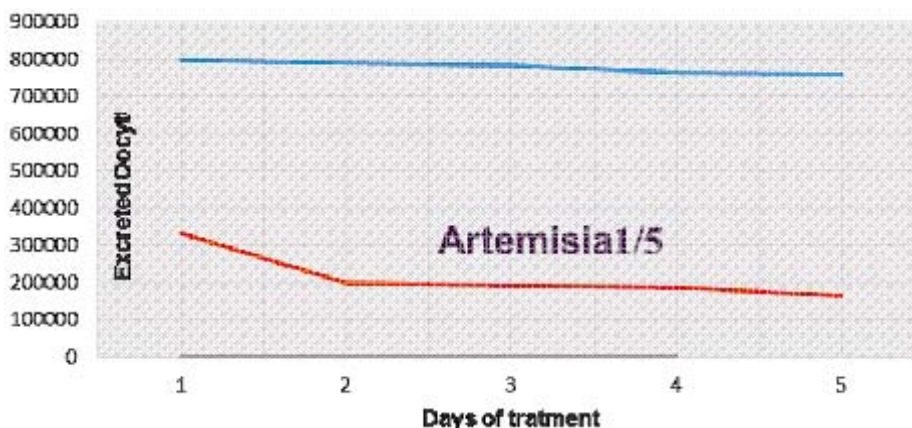


Fig. 2: The effects of Artemisia Siberi extract at a dose of $1.5 \frac{mg}{kg}$ and comparing with the positive control group F is obvious in Fig. 2 that illustrates reducing effects

dose of 1.5 and comparing with the positive control group F is obvious in Fig. 2 that also illustrates significant reducing effects. The effects of herbal complex extract at a dose of 0.5 in Fig. 3 and a dose of 1.5 in Fig. 4 compared with the positive control group F represents a reducing effect on oocyst shedding them. Nearly 100% reducing effect of lasalosid drug and comparing with the positive control group F is shown in Fig. 5. Finally, the effect of each five challenges are compared with each other in terms of the mean number of oocyst excreted within 5 days in Fig 6.

There is a significant difference in OPG between positive control group F and each treated patient group, indicating the positive and useful effects in all remedies against coccidiosis (the

number of oocyst per gram of feces excreted = OPG)

There is a significant difference in OPG between the group treated by Artemisia extract at a dose of 1.5 mg/kg and the group treated by Artemisia extract at a dose of 0.5 mg/kg and the group treated by apacox herbal complex at both doses, in terms of reduction of oocyst shedding.

There is no significant difference in OPG between the group treated by Artemisia extract at a dose of 0.5 mg/kg and two patient groups treated by different concentrations of apacox, indicating the same effect of 0.5 mg/kg Artemisia with both doses of 0.5 and 1.5 mg/kg apacox, that it also suggests that the effect of Artemisia extract is more useful

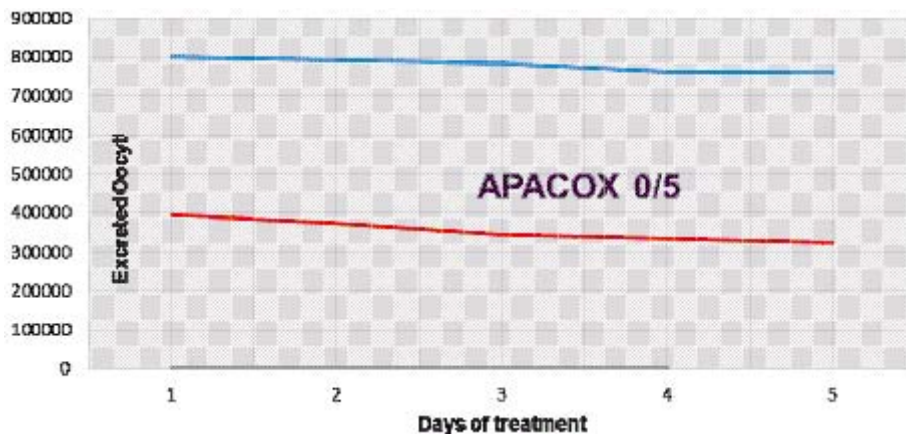


Fig. 3: The effects of herbal complex extract at a dose of $0.5 \frac{mg}{kg}$ and comparing with the positive control group F is obvious in Fig. 3 that also shows reducing effects

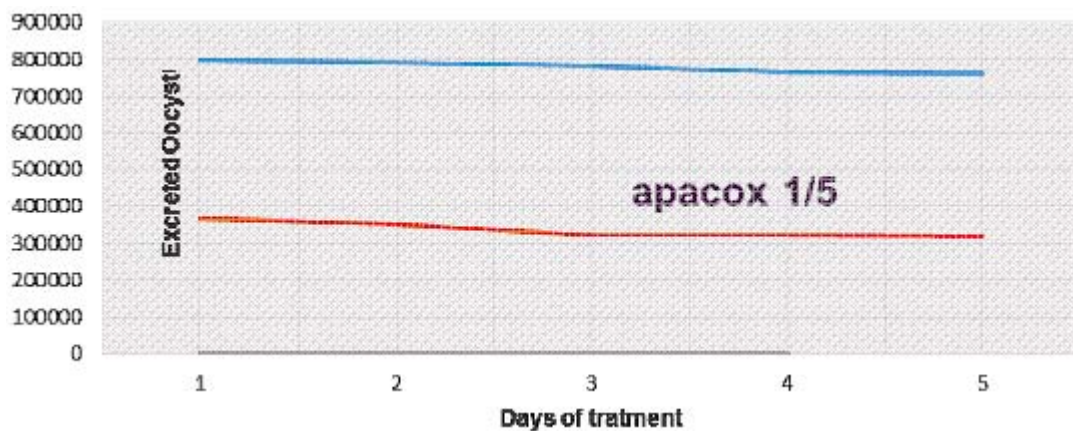


Fig. 4: The effect of herbal complex extract at a dose of $1.5 \frac{mg}{kg}$ in Fig. 4 compared with the positive control group F represents a reducing effect on oocyst shedding

and more effective than apacox. There is no significant difference in OPG between two different concentrations of apacox.

In total, there is a significant difference in OPG between the group treated by lasalosisid drug and four groups treated by herbal extract, that it also suggests that the effect of lasalosisid drug is better than other herbal compounds. Totally, the current paper indicates that Artemisia Siberi and apacox herbal complex, each one has a significant effect on the reduction of oocyst shedding in infected chickens. The effect of Artemisia extract at a dose of 1.5 mg/kg is much more than apacox complex and Artemisia extract at a dose of 0.5 mg/kg and it can imply that we can profit from this extract

at this dose as an effective treatment against coccidiosis. Of course, Artemisia extract at a dose of 2.5 mg/kg had been recognized useful in previous articles (25).

In our paper, there was a significant difference between the effect of Artemisia extract at doses of 1.5 mg/kg and 0.5 mg/kg. It can support the positive effects depending on the dose of Artemisia extract at doses below 2.5 mg/kg and it is exactly in opposition to papers which negate dose-dependent effects at doses higher than 2.5 mg/kg, meaning that totally, Artemisia Siberi extract can be applied up to a maximum dose of $2.5 \frac{mg}{kg}$ as dose-dependent manner.

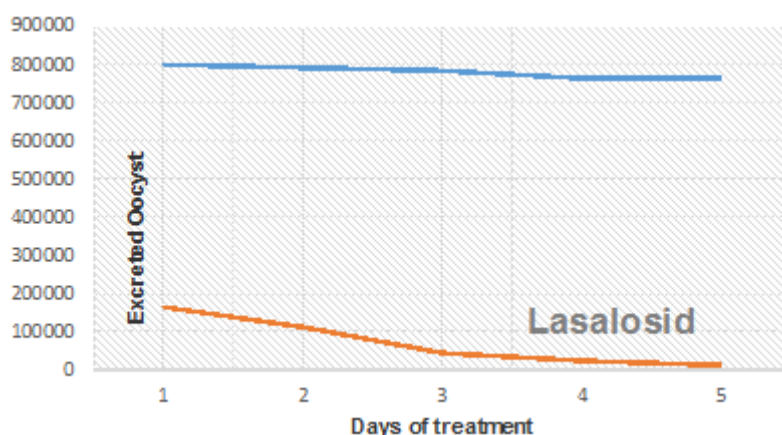


Fig. 5: Nearly 100% reducing effect of lasalosisid drug and comparing with the positive control group F is shown in Fig. 5.

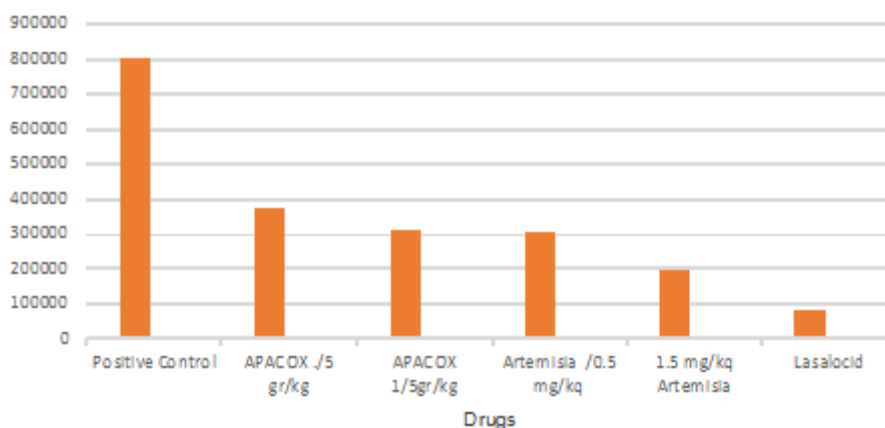


Fig. 6: The effects of each five challenges in terms of the mean number of oocyst excreted within 5 days in Fig 6

DISCUSSION

The cause of anti-coccidiosis beneficial effects of this extract is attributed to Artemisinin active ingredient which is a Sesquiterpene - Lactone – *Trioxane* that has widespread medicinal effects such as antimalarial and anticoccidial. Of course, the effect of *Artemisia Siberi* extract at doses of 1 and 2.5 mg/kg obviously reduced oocyst shedding in many other articles. This study not only emphasizes on earlier studies and provides a relative effective dose of the extract to treat coccidiosis, but also on the other hand, is the only study that compares the effect of *Artemisia* extract with apacox complex and Lasalosid drug and provides a useful comparison. Of course, the only problem of *Artemisia* extract is its low solubility in water, that like the paper by Mr. Arab, it can be granulated as standard and marketed. It is obvious that, more research is certainly needed to explore the effects and side effects of long-term treatment with *Artemisia Siberi* extract in days of treatment for broiler chickens. Totally, after the present study, if we can be aware of the side effects of the extract

and also, standardize Artemisinin active ingredient, that exists in the extract and in case of using different parts of a plant or plants, its amount varies in powdered extract, *Artemisia Siberi* extract can be benefited as a useful anticoccidial treatment.

CONCLUSION

In total, anticoccidial effect of *Artemisia Siberi* extract at a dose of 1.5 mg/kg is much better than apacox herbal complex at its therapeutic doses. Although this effect is not similar to that of lasalosid drug, it can be successfully used as an anticoccidial treatment due to successfully reducing an enough percentage of oocyst shedding in chickens that is much better than apacox herbal complex which is recently commercialized and widely used, especially in Europe and America.

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