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ORIGINAL ARTICLE

The Effect of Ivermectin Pour-on Administration Against Natural Ascaridia Galli Infestation and its Prevalence in Native Poultry

¹Khayatnouri Mirhadi, ²Garedaghi Yagoob, ³Khalili Heidar and ³Arbati Alireza

¹*Department of Pharmacology, Tabriz Branch, Islamic Azad University, Tabriz, Iran.*

²*Department of Parasitology, Tabriz Branch, Islamic Azad University, Tabriz, Iran.*

³*Tabriz Branch, Islamic Azad University, Tabriz, Iran.*

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ABSTRACT

One of the real problems that cause the economic prejudice in animal farms yearly is parasitic diseases. To overcome these problems the use of antiparasitic drugs is necessary. Ivermectin is a broad spectrum antiparasitic agent and different routes of its administration such as injection, oral and pour-on were used. The aims of the current study were evaluation of the efficacy of ivermectin pour-on administration against natural *Ascaridia galli* infection in native poultry and also determination the prevalence rate of this parasite in Tabriz area. In the present study, 120 native poultry were investigated by EPG (egg per gram of feces) feces test. Willis method was applied for feces test and Mack-master slide method was used for counting nematode eggs. After confirming the infection with worms, Ivermectin (0.5 mg/kg) pour-on was administered to infected birds. Fecal examination was repeated in 1, 7, 21 and 28 days post treatment. Results showed that total prevalence of *Ascaridia galli* infection was 60.83% in native poultry of Tabriz area. Efficacy rate of ivermectin pour-on was 65.79, 89.72, 94.47 and 97.85% in 1, 7, 21 and 28 days respectively. In conclusion, the effect of this drug against *Ascaridia galli* resulted in reduction in egg count exceeded 98% ($p < 0.05$), so this drug can be used in antiparasitic program in poultry. Further investigations are necessary to evaluate the drug effect on other nematodes and parasitic infections.

Key words: Ivermectin, Pour-on, *Ascaridia galli*, Poultry, Iran.

Introduction

Infections with gastrointestinal nematodes are very common on native poultry in Iran and all over the world. Parasitic infections of poultry are major factors responsible for economic losses through reduction in productivity and increased mortality [26,27]. Parasites cause the birds to be unthrifty which may include the loss of weight. Due to parasitism, the animals become susceptible to other health problems which can lead to death. Many researches for prevalence rate of gastrointestinal

parasites all over the world have been reported but researches for effect of anti parasitic drugs by different administration routes is low and in Iran the study on present subject has not been done [8,10,12,18]. Ivermectin is a member of the macrocyclic lactone class of endectocides.

It is labeled for the treatment of internal and external parasites in dogs, cats, horses, pigs, sheep, cattle and birds. Subcutaneous (SC) and topical (TOP) formulations are available for use in animals, at a dose of 0.2 and 0.5 mg/kg bodyweight, respectively.

Corresponding Author

Khayatnouri Mirhadi, Department of Pharmacology, Tabriz Branch, Islamic Azad University, Tabriz, Iran.
Tel: 00989143005855
E-mail: Khayat.nouri@gmail.com

Ivermectin is a highly potent broad-spectrum anthelmintic that is widely used in different animals. It is available in injectable, oral and topical formulations for use in animals [20,25]. The most important GI nematode responsible for considerable production losses in poultry is *Ascaridia galli* [26,27]. The objective of the present study is the evaluation of the effect of ivermectin pour-on administration against natural *Ascaridia galli* nematode infections and determination of its prevalence rate in native poultry. This study is the first report in Iran.

Material and method

In present study a total number of 120 native poultry to *Ascaridia galli* infestation, from 20 different farms in Tabriz area were subjected for fecal examination and EPG. Ivermectin was administrated to treat infected animals at a dose of 0.5 mg/kg. Also pour-on form of 0.5 % Ivermectin powder in Isopropyl alcohol was made. Before and after poultry treatment, 3 fecal samples of each animal were taken for fecal examination and egg count was recorded. Fecal examination in days 1, 7, 21 and 28 after treatment were repeated.

Table 1: Average number of egg in fecal samples before and after treatment with pours on Ivermectin and percentages of egg count reduction.

Before treatment	1 day after treatment	7 days after treatment	21 days after treatment	28 days after treatment
652	223 (65.79%)	67 (89.72%)	36 (94.47%)	14 (97.85%)

Discussion:

According to results of crosscal-walis test it is possible to determine which pour on administration of Ivermectin decreases the natural infestation of bird with *Ascaridia galli*. The efficacy rate of Ivermectin on this parasite is more than 98%. Recently, Ivermectin has different drug shapes. Half time of intra venal administration of Ivermectin with dose of 300µg/Kg in cattle is 2.8day, but in subcutaneous administration with dose of 200µg/Kg is 8day and also has been shown that the effect of sustained-release administration of this drug in cattle is more than to oral and subcutaneous administration [15], but in poultry any research was not done. The important base in use of antiparasitic drug is the increase of contact time of drugs with parasites rather than increase the dose of these drugs [8,10,15,18,19]. This subject has been demonstrated that Ivermectin with dose of 1mg/kg (oral or injection) have effective antiparasitic role in veterinary. The dose of this drug in cattle for oral and subcutaneous administration is 0.2mg/kg and for pour on administration is 0.5mg/Kg; these doses of Ivermectin have potent anthelmintic effect between 97-100% on adult form and forth stage larvae of *Haemonchus*, *Ostertagia*, *Cooperia*, *Trichostrongylus*, *Strongyloides*, *Bonostomum*, *Nematodirus*, *Trichuris*,

In the present study, Willis method for fecal examination and Mack-master slide method for egg examination (EPG) were used [1,13]. Ivermectin efficacy was calculated according to the following equation: % of drug efficacy= P-R/P×100

R = Average number of parasite egg in gr of fecal sample after treatment

P = Average number of parasite egg in gr of fecal sample before treatment

Data were analyzed by non-parametric crosscal-walis and P<0.05 was considered significant.

Results:

The results of present study indicated that 73 animals from a total of 120 were infected with *Ascaridia galli* with a prevalence rate of 60.83%. Average number of enumerated egg in infected non treated animals was 652.

The average number of enumerated egg in fecal samples after treatment with pour on Ivermectin has been shown in table 1. Reduction percentages in egg count after 1,7,14 and 21 days of treatment with Ivermectin were 65.79, 89.72, 94.47 and 97.85 respectively (table 1).

Oesophagostomum, *Dictyocaulus* and *Chabertia ovina* and some arthropods [8,10,15,18,19], therefore we administrated ivermectin pour on with 0.5mg/kg dosage in poultry. According to findings of previous researches, tablet form of Ivermectin with dose of 0.4mg/Kg causes reduce in eggs in feces during 10 week after treatment but has not protective role for reinfection of cattle [5,6,15]. Subcutaneous administration of Ivermectin with dose of 0.2mg/Kg and pour on of that with 0.5mg/Kg dose, have high effective role for control of parasites, also have important protective role for reinfection in cattle.

Also according to findings of researchers, administration of Ivermectin with dose of 0.5mg/Kg has high effect between 95-100% on *Haemonchus*, *Oesophagostomum* and *Bunostomum* [5,6,15] and also on *Boophilus*, *Damalina* and others arthropods [2,3,4,11,13,15].

According to findings of Sharma and The efficacy of ivermectin against *Ascaridia galli* infection was evaluated in chickens under controlled laboratory conditions. The chicks in the treated group were subcutaneously injected with ivermectin at a dose of 0.3 mg kg⁻¹ body weight. The fall in post-treatment faecal egg counts was 81 and 92% in birds treated on Days 10 and 35, respectively. The drug was found to be 90 and 95% effective against immature and adult worms, respectively.

The lower lesion score and post-treatment near-normal haematobiochemical picture in treated birds confirmed these observations. The treated birds also had a better growth rate than the untreated chickens. The mature worms in the intestinal lumen of the host were more sensitive to the treatment than the immature stages of the parasite in the tissue phase [26]. In present study, the drug effect was observed 28 days after treatment by pour on Ivermectin administration on ascaridia galli 97.85% determined. In study by Sharma *et al* [26] indicated which drug has protective effect on chicks infected with *Ascaridia galli* [26]. In other study by Williams *et al.* on comparison the effect of pour on administration of Ivermectin, Doramectin, Eprinomectin and Moxidectin, they observed that maximum and minimum effect was with Eprinomectin and Ivermectin respectively [24]. Gayrard *et al* [7] proved that Ivermectin and Doramectin could be successfully used for control of gastrointestinal parasites in cattle [7]. Whang *et al.* reported which pour on and injection administration of Moxidectin has positive effect more than 90% on gastrointestinal nematodes and significant different between these two types of administration were not reported [21]. In two studies by Williams *et al* indicated that Moxidectin has very important role for control of parasitic diseases [22,23]. Skogerboe *et al.* and Rehbein *et al.* reported that pour on administration of Ivermectin during rain has antiparasitic effect more than 90% and rain has not specific effect on reduction the role of Ivermectin [14,16,17]. In fact pour on administration of Ivermectin is very easy for farmers and so far, any specific side effects of Ivermectin administration have not been reported [9,15]. Collectively, Ivermectin is very effective drug for control of gastrointestinal parasites in animals and its use is very easy and has not need specific tools. Effect of pour on administration of Ivermectin on other helminths and arthropods needs more studies.

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