

Evaluation of polyherbal anthelmintics in caprine helminthosis

^aAghai Imran Khan * and ^bPajai Kishor

^aSubject Matter Specialist (Animal Science), Krishi Vigyan Kendra, Parbhani, Maharashtra, India.

^bAssistant Professor, Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, PGIVAS, Akola, Maharashtra, India.

Abstract

Total 162 goats of either sex from Akola region were screened for presence of parasitic eggs in their faeces. Out of which 113 goats were found positive for helminth infestation. The overall prevalence of helminthosis in goats of Akola region was found to be 69.75 per cent with higher prevalence in female 73.50 per cent than male 60.00 per cent. Out of 113 goats positive for helminth infestation, 24 goats were selected and randomly divided into four equal groups while another group of six apparently healthy goats free from helminth infestation, was kept as normal, healthy control (T1). Treatment group of helminth infested goats was treated with ethanol extract of neem leaves + ethanol extract of karela fruit + garlic powder given in T2 (100 mg/kg+100 mg/kg+5 g), T3(200 mg/kg+200 mg/kg+7.5 g) and T4 (300 mg/kg+300 mg/kg+10 g) per goat orally once as a single dose respectively while Group (T5) was treated with Febendazole 150 mg tablet orally as a single dose. The body weight, EPG of faeces and haemato-biochemical study were carried out before and after treatment. Polyherbal anthelmintic having higher dose as in fourth group (T4) showed highest efficacy of 92.38 per cent against the worms and higher weight gain on 30th day which was effective and comparable with Febendazole treatment.

*Corresponding Author:

Aghai Imran Khan

Email: imran_vet@rediffmail.com

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Introduction

Helminth infection of gastrointestinal tract is one of the major causes of decreased productivity in goats worldwide, particularly under grazing conditions. A gastrointestinal parasitic infection in goat is characterized clinically by enteritis, anemia, emaciation, dehydration and death. These changes are responsible to affect the growth, body weight, yield and reproductive performance of animal leading to economic loss of the farmer (Sharma *et al.*, 2014). Therefore, in goat management it is essential to evolve cheap and suitable therapeutic measures against helminthes. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several allopathic drugs and development of resistance to currently used drugs for infectious agents have led to increased emphasis on the use of wide variety plant materials as a source of medicines. However, the blind dependence on synthetics is over and people are returning to the naturals with hope of safety and security. Even the allopathic system of medicine has adopted a number of plant-derived drugs which form an important segment of the modern pharmacopoeia (Joy *et al.*, 1998). *Azadirachta indica* (Neem) leaves could play a role as an alternative non chemical source of anthelmintic (Radhakrishnan *et al.*, 2007), Neem leaves contain 'azadirachtin'. It is a

tetranortritetrapenoid of limnoid class which releases the hormone Ecdysone that blocks the production of insect and their metamorphosis where as inhibiting the development of eggs and blocks the molting of larva and responsible for causing hypoglycemia (Susan *et al.*, 2009). *Momordica charantia* (Karela) contains an array of biologically active plant chemicals including triterpens, proteins, steroids, alkaloids, saponins, flavonoids and acids due to which plant possesses anti-parasitic activity. *Allium sativum* (Garlic) has been used to treat animals that suffer from gastrointestinal parasitism (Guarrera, 1999). Studies from organic sheep producers in the US reported the use of garlic as a viable alternative to commercial anthelmintics (Noon, 2003). Therefore, in order to achieve better control and prophylaxis against these infections, it becomes necessary to evaluate the efficacies of different anthelmintics and also prevent development of anthelmintic resistance by rotating different anthelmintics (Sharma *et al.*, 2014) or find the natural one. Therefore, present investigation was undertaken to study the prevalence and evaluation of polyherbal anthelmintics in caprine helminthosis.

Material and Methods

The present investigation was carried out in the Department of Veterinary Clinical Medicine, Ethics

and Jurisprudence, Post Graduate Institute of Veterinary and Animal Sciences, Akola (M.S.). Total 162 adult goats of either sex from different flock of Akola region were screened by microscopic examination for presence of parasitic eggs in faecal samples. Out of 113 goats positive for helminth infestation, 24 goats were selected and randomly divided into four equal groups, each comprising six goats. While another group of six apparently normal healthy goats free from helminth infestation, was kept as normal, healthy control.

Indigenous plants having anthelmintic property were selected 1) *Azadirachta indica* (Neem), 2) *Momordica charantia* (Karela) and 3) *Allium sativum* (Garlic). The ethanol extract of Neem leaves (*Azadirachta indica*) and Karela fruit (*Momordica charantia*) were prepared by cold extraction method (Rosenthaler, 1930) and Garlic powder was prepared in the laboratory using mixer grinder.

First group (T₁): Apparently normal healthy goats free from helminth infestation, without treatment were kept as normal control. Second group (T₂): Helminth infested goats were treated with ethanol extract of Neem leaves (*Azadirachta indica*) at 100 mg/kg, ethanol extract of karela fruit (*Momordica charantia*) at 100 mg/kg and Garlic powder (*Allium sativum*) 5 gm per goat orally once as single dose. Third group (T₃): Helminth infested goats were treated with ethanol extract of Neem leaves (*Azadirachta indica*) at 200 mg/kg, ethanol extract of karela fruit (*Momordica charantia*) at 200 mg/kg and Garlic powder (*Allium sativum*) 7.5 g per goat orally once as single dose. Fourth group (T₄): Helminth infested goats were treated with ethanol extract of Neem leaves (*Azadirachta indica*) at 300 mg/kg, ethanol extract of karela fruit (*Momordica charantia*) at 300 mg/kg and Garlic powder (*Allium sativum*) 10 g per goat orally once as single dose. Fifth group (T₅): Helminth infested goats were treated by giving Fenbendazole 150 mg tablet orally once as single dose.

The body weights of all the goats under study were recorded using weigh balance before treatment ('0' day) and on 7th, 15th and 30th day post-treatment. Approximately 3-5 g of faecal sample were collected from each goat directly from the rectum in a plastic container for microscopic faecal examination on 0th day (before treatment) and on 7th, 15th and 30th day post-treatment. Microscopic examination of faecal sample was carried out by Sedimentation/Floatation technique (Soulsby, 1982) and Faecal sample from each goat was collected in sterile bottle and EPG was determined by Stoll' dilution method (Soulsby, 1982).

Data was collected and analyzed statistically by application of Factorial Completely Randomized Design and Completely Randomized Design (Snedecor and Cochran, 1994).

Results and Discussion

The experiment was conducted with an aim to evaluate the effects of polyherbal anthelmintic in caprine helminthosis, which was evaluated on the basis of elimination of worm infection in terms of egg per gram (EPG) of faeces, clinical improvement and duration of complete recovery.

Out of 162 goats screened for the presence of parasitic eggs in their faecal samples from different areas of Akola region, 113 were found positive for either single or mixed infection indicating a prevalence of (69.75%). Among 113 positive goats, 87 (76.99%) had single infection and 26 (23.00%) had mixed infection. It was observed that among the positive goats, different species found were viz., *Haemonchus* spp. 48 (42.47%), *Trichostrongylus* spp. 35 (30.97%), *Trichuris* sp. 32 (28.31%), *Bunostomum* spp. 18 (15.92%), *Oesophagostomum* spp. 08 (7.07%), *Eimeria* spp. 05 (4.42%) and *Moniezia* spp. 03 (2.65 %). Zeryehun (2012) studied helminthosis in sheep and goats where he found an overall prevalence of 472 (61.4%) in the small ruminants, where as 259 (67.75%) in sheep and 213 (55.47%) in goats harbor one or more genera of helminthes with nematodes (59.89%) being the most prevalent helminthes. Similar finding were also observed by (Arora et al., 2010; Sutar et al., 2010; Sharma et al., 2014). Out of 45 samples from male goats examined, 27 samples were found positive for endoparasitic infection showing prevalence of 60.00 per cent and out of 117 samples examined from female goats, 86 samples found positive indicated 73.50 per cent prevalence of endoparasitic infection in Akola region. Sex wise prevalence of caprine helminthosis shows higher prevalence in female (73.50 %) than male (60.00%). This observation is in agreement with Sutar et al. (2010) who recorded higher prevalence of helminthic infection in female goat than male goat. The higher incidence of helminthic infection in female goat might be due to stress factor in female like lactation and pregnancy (Arora et al., 2010).

In normal healthy group (T₁), average values of body weights showed increasing trend throughout the experimental period with overall mean of 24.91±0.22, which was significantly higher in comparison to helminth infected group. The reduction in body weight may be due to poor absorption of food material, reduced efficacy of feed utilization because of enteritis and poor appetite (Kolhe, 1989). In all treated groups there was a gradual increase in body weights over a period of 30th day post treatment though it was non-significant. At the end of experiment on 30th day post treatment the apparent increase recorded in body weights could be due to elimination of worms, reduction in EPG and might be due to garlic treatment. In goats of group T₂, T₃, T₄ and T₅ average weight gain recorded were 0.91 kg, 1.00 kg, 1.5 kg and 1.75 kg, respectively which indicated the better effect of given anthelmintics. Thus, it was observed that, T₅ group which received Fenbendazole 150 mg orally once as a single dose had improved body weight more efficiently

than all other treatments, while the T₄ group which was treated with higher dose of polyherbal anthelmintics showed better increase in body weights as compare to T₂ and T₃.

The severity of infection in positive faecal samples was assessed by estimating eggs per gram of faeces (EPG). The EPG was estimated before treatment i.e. 0th day and on 7th day, 15th day and 30th day after treatment to evaluate the efficacy of different anthelmintic preparations used. Simultaneously EPG was estimated for control untreated group also. The mean EPG count at pretreatment did not vary significantly in all the treatment groups (1733.37 to 1766.66) while there were significantly lowered EPG values recorded on day 7th post-treatment in all the treated groups and there was significant difference in EPG values between the groups T₂, T₃, T₄ and T₅ on 7th day post-treatment where lowest EPG (366.66±21) was found in T₅ group. On day 15th post-treatment, EPG count were progressively and significantly reduced further in T₂, T₃ and T₄ while it was zero in group T₅ (Fenbendazole) which is in agreement with Garg et al. (2004) and Kumar et al. (2008) who also recorded zero EPG on day 15th post-treatment. On day 30th post-treatment, progressive significant decrease in EPG count was recorded while group T₅ was persistent with zero EPG. But between the treated groups EPG count was significantly lowered in T₄ group (133.33±21.08) as compared to T₂ and T₃ (383.33±30.73 and 266.66±21.08) indicating higher

efficacy of polyherbal group at higher dose rate. Decrease in EPG count after treatment with aqueous extract of *Azadirachta indica* leaves was also reported by Radhakrishnan et al. (2007) and Amin et al. (2010). Overall average values of EPG count in all the treated groups had significantly decreased which showed the trend of decreasing EPG with increasing (dose) concentration of herbal drugs. The per cent decrease was highest (100%) in group T₅ (Fenbendazole) followed by T₄ (92.38%) and T₃ (84.61%) and T₂ (78.30%) on 30th day post-treatment indicating better anthelmintic efficacy of herbal drugs when used at higher dose rate.

Conclusion

Polyherbal anthelmintic (ethanol extract of neem leaves + ethanol extract of karela fruit + garlic powder) having higher dose as in fourth group T₄ (300 mg/kg +300 mg/kg +10g) per goat orally once as a single dose showed highest efficacy of 92.38 per cent against the worms and higher weight gain on 30th day which was effective and comparable with Fenbendazole treatment.

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