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Research Paper

Anthelmintic effects of *Murraya koenigii* against veterinary important gastrointestinal parasite (*Trichuris spp*)

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Abstract

It is recognized that helminth infections cause major economic losses in small ruminant sectors. There are so far no true vaccines against gastrointestinal parasites, neither for livestock, nor for pets. Dewormers are available in formulations for oral delivery either as solids (tablets, pills, etc.) or as liquids and are also expensive. *Murraya koenigii* leaves and its crude extract and alcoholic preparations were used in the laboratory experiments to show its anthelmintic activity. The mortality rate was more pronounced in alcoholic preparations (25%, 50% and 100%) followed by crude extracts (25%,50% and 100%)of *Murraya* leaves. It was also found that there was a direct relationship between the mortality rate and higher concentrations of the *Murraya* leaves.

Keywords: *Murraya koenigii*, Trichuris spp, Helminth, Dewormer, anthelmintic

Introduction

Internal parasitism is one of the biggest problems in the small ruminant industry. Internal parasite infestations of herds can cause major health issues, which have a major effect on the animal's performance and cause great economic loss to the producer as explained by Suarez and Busetti[1]. In fact, most of the economic losses caused by internal parasites are actually not due to mortality but production loss as shown by Waller[2]. As the goat producer faces issues like the rise of anthelmintic resistance among parasites, the knowledge of how to properly manage internal parasites becomes necessary for the survival and the economic viability for herd. Tsotetsi and Mbati[3] described parasitic helminthes of veterinary importance in cattle, sheep and goats on communal farms in the north-eastern free State in South Africa. Parasitism can cause decreased fertility, abortion, increased susceptibility to disease, and death in the herd animals. The effect of parasitism is determined by the interactions between the type of parasites present in the geographic area, parasite life cycles, the environment including weather patterns and type of farm management, and the host factors as described by the Nwosu et al.[4].

Trichuris is a genus of parasitic roundworms belonging to the family Trichuridae. They are found worldwide but are more abundant in regions with tropical or subtropical climate. Prevalence varies from region to region. In endemic regions more than 50% of domestic animals can be infected. prevalence of gastrointestinal parasites has been reported from various parts of India as Kuchai et al.[5] reported helminth parasites in small ruminants from Ladakh and Lone et al.[6] reported presence of coccidian and gastrointestinal nematodes from baramulla Kashmir in the same year i.e. 2011.

There are so far no true vaccines against whipworms, neither for livestock, nor for pets. So far there are no reports on resistance of *Trichuris* species to anthelmintics. Certain group of secondary plant

components and the condensed tannins have been investigated as an anthelmintics for treating the cattle Min et al.[7] decribed the effect of grazing forage containing condensed tannins on gastro intestinal parasite infection and milk composition in Angora does in the year 2005. Carbazole alkaloids were also extracted from the curry leaves by Bhattacharya et al.[8] and Chowdhary et.al.[9] In the present study use of herbal extract of *Murraya* is a step forward in the field of using herbal products or plant parts as an anthelmintic drug, antimicrobial activity of curry leaves has been described by Goutam and Purohit[10] and from stem bark by Zachariah et al.[11]. Antidiarrhoeal activity was described by Pagariya et al.[12] In this experiment four different methods were used to check the anthelmintic effect of herb (curry leaves) as compare to Albendazol drug.

1. Collection of parasites from fecal sample: Diagnosis of internal parasite infections is normally done by fecal analysis. Fresh fecal samples were collected from a number of goats in order to obtain more accurate representation of the level of infection. Total 25 intestines were collected from local abattoir for each experiment in the month of May and June and intestines were cut open to collect the fecal matter. Fecal samples than collected and sieved under pressure of running tap water. Live parasites were collected directly in the normal saline solution for the experiment.

2. Collection of Plant Material:
The fresh leaves of *Murraya koenigii* were collected from the forests of Dhoolkot Dehradun Uttarakhand, India during May to June. The fresh curry leaves were weighed. Leaves were divided into 3 equal parts and one part of the fresh leaves was used in crude extraction. Rest of the two parts of curry leaves were dried under shade and than in oven at moderate temperature. After drying, leaves were coarsely powdered for the further use.

1. Crude extract:
Fresh leaves were crushed with the help of pestle mortar and than filtered with muslin cloth. The pure extract was being used to observe the Anthelmintic activity. The extract was stored in freezer for future use. 25% 50% concentrations were made in Lock lewis solution.

2. Soxhlation:
The dried leaves of M*urraya koenigii* was extracted with methanol using soxhlet extractor. Alcohol was used as a solvent (500ml).The set up timing was for about 5 hours and 10 cycles were observed each of which is completed after every ½ an hour. After extraction the solvent is removed, typically by means of a rotary evaporator, yielding the extracted compound. The compound was than dissolved in 1% DMSO. The extract was used to make different concentrations with lock lewis solution.

3. Control:
For control the anthelmintic drug (albendazole) was used. Different concentrations were prepared in lock lewis solution. Worms were treated with each concentration and the mortality rate was observed for the 6 hours.

Study of Anthelmintic Activity: The anthelmintic activity of the extracts of leaf *Murraya koenigii* was examined on adult parasites. In each method, three concentrations were made i.e. 25%, 50% and 100% for each of the experiment. The time taken to kill individual worms was observed. Death was noted when the worms became immobile even in the normal saline solution or in the worm water. Death was concluded when the worms lost their motility.

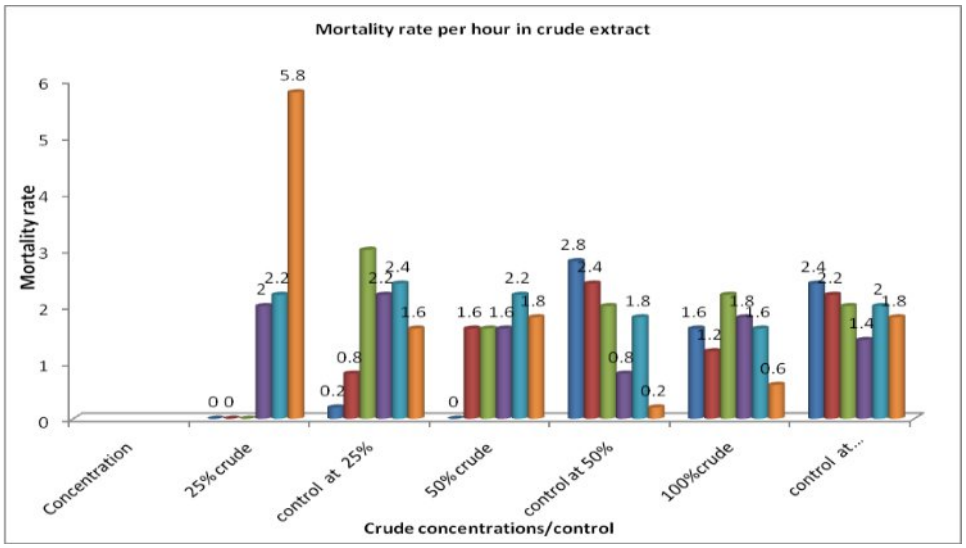
Results and Discussion

1. Crude Extract/Control:
The mortality rate was compared between the three concentrations of control and crude extract. The mortality rate in control (25% albendazol) was greater than 25% and 50% concentration of the crude extract of Curry leaves .In the first three hour mortality rate was zero in 25% crude extract incubated worms but started increasing with the passage of time. In 1st hour and 2nd hour the mortality rate was greater in control, but during third hour mortality rate starts increasing in 50% concentration of crude extract worms.

Table 1: Crude Extract/Control -Mortality Rate

Concentration	Timings					
	1st Hour	2nd hour	3rd hour	4th hour	5th hour	6th hour
25%	0±0	0±0	0±0	2±0.70	2.2±0.44	5.8±0.82
Control at 25%	0.2±0	0.8±0.83	3±1.22	2.2±0.83	2.4±0.54	1.6±0.54
50%	0±0	1.6±0.89	1.6±1	1.6±0.70	2.2±1.51	1.8±1.30
Control at 50%	2.8±0.44	2.4±0.54	2±0	0.8±1.04	1.8±1.30	0.2±0.44
100%	1.6 ±0.89	1.2±0.83	2.2±1.78	1.8±0.83	1.6±1.14	0.6±0.89
Control at 100%	2.4±0.89	2.2±0.83	2±1.22	1.4±1.14	2±0.44	1.8±0.83

Results are mean SD (Between experimental and control animals)



Mortality rate in control (100% albendazol) was greater than 100% concentration of the crude extract of Curry leaves in 1st hour and in 2nd hour but in 3rd, 4th,5th , 6th hours there was a slight increase in mortality rate.

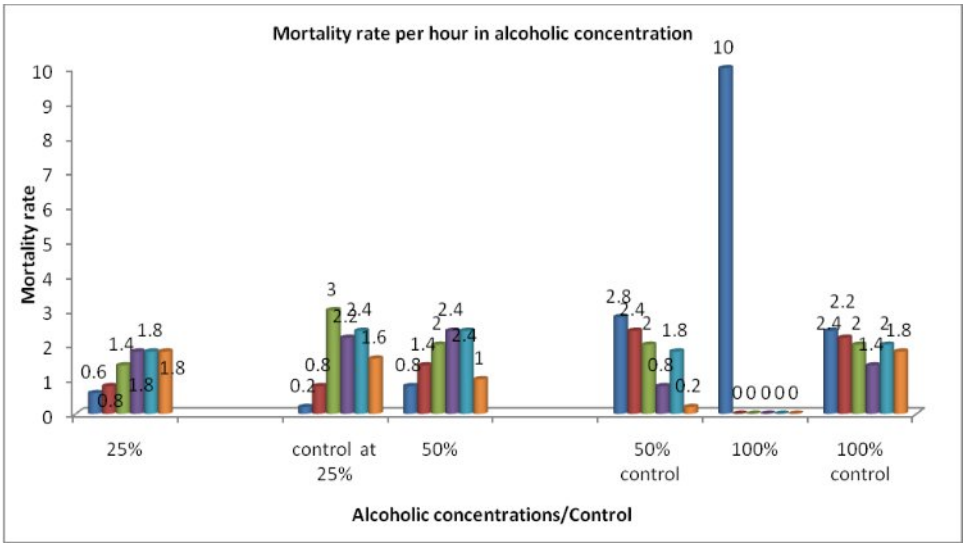
2. Soxhlation / Control:

The mortality rate in control (25% albendazol) is all most equal to the 25% concentration of the soxhlation in first two hour after that it falls as the time increases.

Table 2: Soxhlation/Control-Mortality Rate

Concentration	Timings					
	1st hour	2nd hour	3rd hour	4th hour	5th hour	6th hour
25%	0.6±0.89	0.8±0.83	1.4±0.89	1.8±1.30	1.8±1.09	1.8±0.70
control at 25%	0.2±0	0.8±0.83	3±1.22	2.2±0.83	2.4±0.54	1.6±0.54
50%	0.8±0.83	1.4±0.54	2±0.70	2.4±1.67	2.4±0.89	1±0.70
50% control	2.8±0.44	2.4±0.54	2±0	0.8±1.04	1.8±1.30	0.2±0.44
100%	10±0	0	0	0	0	0
100% control	2.4±0.89	2.2±0.83	2±1.22	1.4±1.14	2±0.44	1.8±0.83

Results are mean SD. (Between experimental and control animals)



Mortality rate in control (50% albendazol) is near about 50% concentration of the soxhlation method 1st and 2nd hour it was less but with the increase in time it become equal. In control (100% albendazol) motality rate was less than 100% concentration of the soxhlation as all the worms were dead in first hour.

Conclusion

Curry leaf has very much higher flavonol profile. Various carbazoles from curry leaf extract were discovered earlier. Some Quantitative determination of constituents of aqueous Curry leaf extract reported the presence of Total phenols, flavonoid and condensed tannins Alkaloid contents were estimated earlier. Although mortality was less but still crude extract was effective against the *Trichuris* species mortality rate was seen in different concentrations this may be due to the presence of the different constituents like phenols, flavonoid, tannins and Alkaloids . In soxhlation the mortality rate in first hour was 100% in the 100% concentration, it was also high in other concentrations ie (25% and 50%).It also may be due to the different constituents of curry leaf or may be due to the use of alcohol /ethanol in these methods. Hence the herb (*Murraya koenigii*) was proved to be effective against the gastrointestinal goat parasites (*Trichuris* species).

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