HELMINTH EGG HATCHABILITY STUDIES IN GOATS FOLLOWING EXPOSURE TO THE DECOCTION OF A ROOT BARK OF *ALBIZIA ANTHELMINTICA,* A POPULAR MAASAI LOCAL ANTHELMINTIC[1].

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ABSTRACT

Primary information obtained by Participatory Research methods in Simanjiro District from 1997 to 2000 by VETAID and ADRI revealed that *Albizi anthelmintica* is a popular medicinal plant among the Maasai Pastoralists used extensively for the control of worms not only in man but also in livestock . *A. anthelmintica,* has been shown to be among the priority medicinal trees of Shinyanga Region of Tanzania (Dery et al. 1999) and Simanjiro District (Minja and Allport 1999). The action of this drug, however, on different stages of worms has not been clearly elucidated. In an earlier experiment, A. had been shown to exert a reduction in feacal egg counts in a dose response manner (Minja, 2002). In the current study, efficacy trials on *A. anthelmintica* in naturally acquired infections were undertaken in local goats at ADRI experimental farm at Luguruni where they were left to graze freely. The goats age ranged from 6 months to 2 years. After the animals had attained an Egg Per Gram (EPG) of above 1000, they were divided into four groups of seven animals each selected randomly, viz: **control group** which was drenched with distilled water, **experimental group I,** which was drenched with the dose recommended by traditional healers, **experimental group II** which was dosed with 1½ times the dose recommended by traditional healers and **the standard group** dosed with Nilzan as a standard anthelmintic. After ten days, 15 gms of the pooled faeces from each group were cultured for 7 days according to standard techniques described by Jorgen Hansen and Brian Perry (1994). The reduction on egg hatchability in the **Standard**, **experimental group I** and **experimental group II** were 96%, 94.4% and 98.3% respectively as compared to the **control group**, and moreover *A. anthelmintica* exerted a dose response effect. The difference between the control group (drenched with distilled water) and the standard and the two experimental groups were statistically significant ($P< 0.05$) as analysed by chi – square test. The results therefore suggest that A. *anthelmintica* exerts anti-viability effect on helmith eggs.

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INTRODUCTION

Several field surveys have been conducted among different ethnic groups in Tanzania on indigenous knowledge to find out how are herbs utilized in the treatment and control of animal diseases. (Minja, 1981; Minja, 1984; Minja, 1989; Minja, 1994; Mahuyemba, 1997; Maeda –Machang'u et al., 1995; Minja and Allport, 2001. Judging from the range of diseases the herbs were reported to be capable of treating and controlling, it is obvious that herbs possess diverse pharmacological properties e.g antibacterial, antiviral, anthelmintic, immunomodulatory, antifungal, antidiabetic, acaricidal, insecticidal to mention but just a few. Use of herbs to combat the problem of both ecto and endoparasites is on the increase in Tanzania not only because they are cheaper than the commercial drugs but also because they have been known to be highly effective and environmentally friendly (Magwisha et al. 1998). Although Ivermectin based products for example have been praised for being highly effective in eradicating a cross section of worms, yet they are reported to leave residues in the faeces which interfere with the normal breakdown of the dung by damaging the earth worms and other soil micro and macro organisms responsible for soil aeration and fertility.

Does FEC (faecal egg count) findings provide indisputable proof of the status of a herbal dewormer?

Majority of findings based on Faecal Egg Count assessment criteria bear witness to the fact that herbal dewormers fail to clear worm eggs by up to 100% , meaning that some amount of eggs are still present in the faeces of animals exposed to the recommended dose rate of traditional herbal dewormers (Jani and Patel 1998). This phenomenon was also seen by us in an earlier experiment (Minja 2002), whereby although eggs were substantially reduced in the experimental group of animals drenched with the recommended dose of *A. anthelmintica* compared to the untreated group yet faecal worm eggs were not completely cleared. In the current experiment therefore we decided to find out whether eggs still being released even

after the animals had been exposed to the recommended herbal dosage were viable or not.

MATERIALS AND METHOD

Collection and preparation of the bark of A. *anthelmintica*

The bark of *A. anthelmintica* was collected in Handeni Tanga the chosen site of the investigations. The traditional healers there estimated the dose of the root bark they thought was enough for one goat, which weighed 5 gms, equivalent to 140 gms for 28 goats . According to the traditional healers' instructions, the bark was boiled in 3 litres of water for 30 minutes. After cooling the decoction (boiled mixture) was filtered through fine cotton bandage (cloth) after which 500 mls of the filtrate were lyophilised and the rest was left for drenching the animals. After lyophylisation (removal of water through freeze drying), one ml of the *A. anthelmintica* filtrate was found to contain 20 mg of *A. anthelmintica* dry matter (supposedly the active material responsible for activity)

Faecal sampling

At weekly intervals faecal samples were collected from the goats directly from the rectum to determine the concentrations of the parasite eggs (EPG) for a period of one month.

EPG counting procedure: 4 g of faecal sample were ground and mixed with 56 ml of flotation fluid (a saturated salt solution in water). After filtering through a "tea strainer", a sub-sample was transferred to both compartments of a McMaster counting chamber and allowed to stand for 5 minutes. All helminth eggs were counted under a microscope at 10x magnification and multiplied by 50 to yield the EPG (Eggs per gramme) of faeces (Hansen and Perry 1994). At the end of one month when the average EPG had reached above 1000 in the majority of the animals, the animals were weighed and randomly split into 4 groups of 7 animals each, representing Control group (treated with boiled and cooled water), Experimental group I (Treated with the dose of *A. anthelmintica* recommended by traditional herbalists i.e. 2mls/kg body weight of *A. anthelmintica* decoction equivalent to 40 mg/kg of

A. anthelmintica active substance). Experimental group II (was treated with 1½ times the dose of *A. anthelmintica* recommended by the traditional herbalists i.e. 3mls/kg body weight of *A. anthelmintica* equivalent to 60 mg/kg of *A. anthelmintica* active substance). The Standard group was treated with a standard broad spectrum anthelmintic, Levamisole (Nilzan Cooper®). Pre-exposure EPG was taken at this juncture and represented EPG at day 0. Ten days after treatment faecal samples were again collected from the animals and examined in the laboratory for parasite egg detection. Animals were then slaughtered and adult worms found in the different parts of GIT system were collected and identified.

Hatchability studies

Culture of the faecal samples as described by Hansen and Perry (1994), was undertaken to study the effect of the drugs on egg hatchability. For this, 15 gms of the pooled dry, moist faeces in each group were finely broken up until they were crumbly and transferred to jars. They were then cultured in the incubator at 27°C for 7 days

Water was added to the cultures regularly every 1-2 days The Baermann technique was then used to isolate infective larvae from faecal cultures. The technique is based on the active migration of larvae from faeces suspended in water and their subsequent collection.

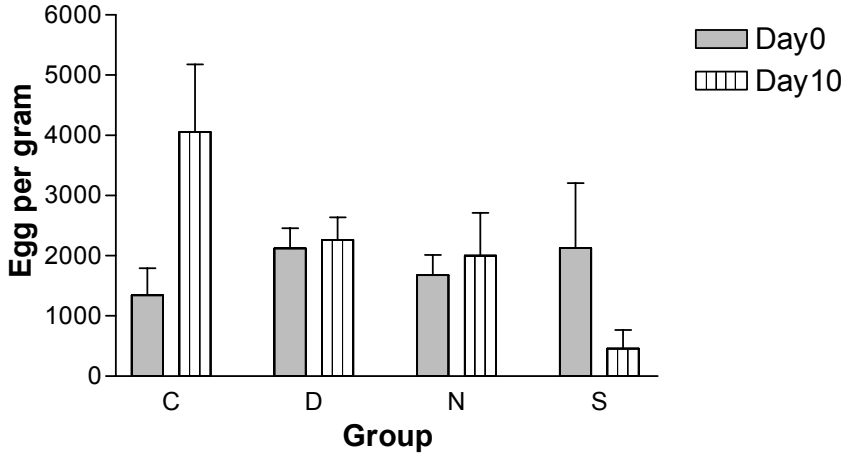
Statistical analysis

Results obtained of Faecal Egg counts were analysed by the students t test for each group against the untreated control group by the help of computer statististix 7.0 package. Parameters on egg hatchability were analysed by chi –square test.

RESULTS

A. anthelmintica could not show any effect on EPG when compared to Levamisole (Fig 1).

Fig 1: Faecal Egg Count (EPG)



C= Control

D= 1½ Times the dose recommended by traditional healers (Experimental group 1)

N= Normal dose recommended by traditional healers (Experimental group 2)

S= Standard anthelmintic Levamisole (Nilzan®)

Worms Identification

Upon slaughter of the animals Two types of worms were identified and these were

Haemonchus contortus which comprised 90%, and *Trichuris ovis* which comprised 10%.

Table 1: Egg Hatchability Results:

A. anthelmintica had a reduction on egg hatchability ranging from 94- 98% comparable to standard anthelmintic levamisole.

GROUP	LARVAE/GRAM	% REDUCTION
(I) Untreated Control	**180**	**0**
(II) Standard Levamisole (Nilzan®)	**7**	**96**
(III) Normal Recommended. Dose: *A. anthelmintica* (**40 mg/kg** body wt)	**10**	**94.4**
(!V) 1½ times the Recommended dose: *A. anthelmintica* (**60mg/kg** body wt)	**3**	**98.3**

DISCUSSION

Up to now in many developing countries there has been little research into the efficacy of veterinary medicinal plants with most research being limited to finding out which plants are used for which purposes (Bizimana, 1998). Small amount of research has been directed on herbal anthelmintic efficacy involving both laboratory and field validations (Jani and Patel, 1998; Fernandez, 1998; Minja, 2002). Inadequate validation approaches, however, can lead researchers into drawing inappropriate conclusions that traditional drugs are not performing to expectations. Recently more and more results based on the EPG assessment alone have been relied upon by a number of researchers in reporting the efficacy status of a number of herbal dewormers . For example Fernandez (2002) found out that of the 18 herbal dewormers reported by villagers in the Phillipines only three plants were effective when judged by faecal egg count method! This means that by relying on this validation method, 83% of the information provided by the villagers proved erronneous which is contrary to the wide held view that traditional knowledge can be trusted since it is loyally passed down from

generation to generation. For triangulation purposes, therefore, more than one validation method should be undertaken to provide proof of efficacy or lack of it with respect to reported traditional herbal remedy!

In the current study, EPG assessment disqualified *A. anthelmintica* as a goat dewormer since the only significant statistical difference was between the group treated with the standard anthelmintic (Nilzan Cooper®) and other groups including the control on day 10, but on the other hand there was no significant statistical difference between Experimental group 1 nor Experimental group 2 and the control meaning that the experimental drug in this experiment (*A. anthelmintica*) from Handeni was not effective in reducing worm faecal eggs in the goats under experiment. From table1 it can be seen that the reduction on egg hatchability in the groups treated with the Standard anthelmintic Nilzan Cooper® , Normal recommended dose of *A. anthelmintica* and 1½ times *A. anthelmintica* dose were 96%, 94.4% and 98.3% respectively as compared to the negative control , and moreover A. anthelmintica exerted a dose response effect. The difference between the untreated control group (drenched only with boiled water) and the standard and the two experimental groups were statistically significant ($P< 0.05$) as analysed by chi – square test.

CONCLUSION

The current study has shown that one validation method is unreliable to form as a basis of judging a reported herbal remedy as inneffective or effective and that at least two methods should be a prerequisite. On the basis of this experiment, *A. anthelmintica* used in this experiment is a potent anthelmintic capable of slowly but surely eliminating the threat of *Haemonchus* and *Trichuris* worm burdern in goats by making the eggs of these worms unviable.

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