

The anthelmintic efficacy of some indigenous plants in the Northwest province of Cameroon

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Key words

Cattle - Calf - *Terminalia glaucescens* - *Vernonia amygladina* - *Solanum aculeastrum* - *Khaya anthotheca* - Anthelmintics - Efficiency - Cameroon.

Summary

Experiments were conducted in nine groups of eight calves to determine the anthelmintic efficacy of four indigenous plants; namely, *Terminalia glaucescens*, *Vernonia amygladina*, *Solanum aculeastrum*, and *Khaya anthotheca*. Calf fecal samples were collected at days 0, 7, 14, 21, 28, 35, and 42 for fecal egg counts by the McMaster slide technique. Results showed that *Solanum aculeastrum*, *Khaya anthotheca* and *Vernonia amygladina* were efficacious with fecal egg count reductions of 34.4, 55.8, and 52.4%, respectively, at full doses at day 21 posttreatment.

INTRODUCTION

Cattle production in the Northwest province of Cameroon is carried out mainly by Fulani herders who have evolved from a nomadic to a semi-nomadic or transhumant cattle production system. In order to cope with the cattle disease situation the Fulani herders have adopted strategies or selected management practices, often designed to protect animal health.

The Fulani herders are deeply involved in ethnoveterinary practices, which were introduced in Cameroon at the end of the last century by nomadic Fulani pastoralists, from neighboring Nigeria and Chad, in search of new pastures (10). The high cost and scarcity of commercial veterinary drugs in Cameroon as in many other developing countries (4, 6) have aroused an interest in traditional veterinary remedies as alternatives to expensive commercial drugs. Another reason could be the unpredictable value of commercial anthelmintics sold in some parts of Africa (8) and the fact that anthelmintic plants are sustainable and environmentally acceptable (2).

Herders are generally very knowledgeable about a lot of plants for the most common diseases and ailments affecting their livestock,

like gastrointestinal parasitism in cattle. Even though Fulani pastoralists have used ethnoveterinary remedies for a very long time and they strongly believe in their efficacy, there is hardly any scientific evidence to confirm such allegation. Hence, studies have been carried out not only to scientifically determine their efficacy (3, 5, 9) and their toxicity, but also to standardize the dosage (10).

This work was conducted to determine the anthelmintic properties of four indigenous plants that were commonly used by the cattle farmers of the province. The efficacy of each plant preparation was compared to that of a commonly used orthodox injectable anthelmintic: levaject 100 (levamisole). The plants studied were:

Bawshihi (*Terminalia glaucescens*)
Suwaaka (*Vernonia amygladina*)
Gitte-nai (*Solanum aculeastrum*)
Kahi (*Khaya anthotheca*)

MATERIALS AND METHODS

Plant materials

Preparation of herbal medicines

Decoction

The plant parts were boiled in water for 15-20 min from the time the water started boiling. Ideally, plant materials were decocted twice in order to extract their active ingredients thoroughly. This was filtered after allowing to cool down.

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■ Infusion

Hot or cold water was poured into the fresh or dry plant material and allowed to stand. The preparation was covered tightly to prevent losing important ingredients. The length of time needed to prepare an infusion depended on the type of plant material and whether the water was hot or cold. In general, a hot infusion was allowed to stand for 5-15 min while a cold infusion might require up to 24 h. The preparation was filtered before administering to the infected animal.

Preparation of experimental plants

■ *Terminalia glaucescens* (Bawshihi)

For the treatment of one calf, 200 g of the freshly harvested and washed bark of Bawshihi was added to 10 g of burnt and powdered limestone and boiled for 30 min in 1.5 l of water until the liquid turned dark brown. The resultant decoction was allowed to cool, was then sieved and ready for use as an anthelmintic drench. Two dosages—0.25 l (half dose) and 0.5 l (full dose)—were administered per calf for each treatment group. The calves were drenched once every morning for three consecutive days.

■ *Vernonia amygladina* (Suwaaka)

For the treatment of one calf 140 g of freshly harvested and washed leaves of Suwaaka were macerated and soaked in 1 l of cool water. This infusion was then filtered through a sieve. Ten grams of burnt and powdered limestone were added to the infusion and used as a drench. Two dosages of 0.25 l and 0.5 l per calf were administered in the treatment groups only once as half and full doses, respectively.

■ *Solanum aculeastrum* (Gitte-nai)

For each calf 340 g of fresh roots of Gitte-nai were harvested, washed and boiled for one hour with 10 g of limestone in 1.5 l of water. The resultant decoction was cooled and the filtrate used as an anthelmintic drench. Two dosages—0.25 l (half dose) and 0.5 l (full dose)—were administered per calf for the respective treatment groups for two consecutive days.

■ *Khaya anthotheca* (Kahi)

For each calf 340 g of the freshly harvested and washed bark of Kahi were boiled with 4 g of limestone in one liter of water. The resultant concoction was cooled and filtered through a sieve and the filtrate used as a drench. Two dosages—0.25 l (half dose) and 0.5 l (full dose)—were administered per calf for each treatment group once every morning for two consecutive days.

Levaject 100

This drug produced by Farvet Bladel, Holland, was administered intramuscularly at a dose of 1 ml/20 kg (7.5 mg/per kg) live weight.

All calves under treatment were weighed on the day of treatment (D0) and were deprived of water for half a day after treatment to avoid further dilution of the drug used.

Experimental animals

Three Fulani settlements served as experimental sites: Sabga, Jakiri, and Fundong. Anthelmintic studies were carried out on 72 young Gudali cattle aged between 3 and 12 months, and weighing between 55 and 150 kg. Eight calves were used for each of the nine treatments. They had grazed all along on natural pasture with predominantly *Sporobolus africanus* grass. Traditionally they were supplemented with salt on a monthly basis. At the onset of the experiment they had not been dewormed for eight months. They

were all screened initially for fecal eggs by the McMaster slide technique. After the first screening those with worm egg counts above 100 were selected for the trial. Each of the selected animals was identified by its Fulani name and an ear tag. At D0 the calves were weighed, the first fecal samples were collected, then the animals were treated. After treatment, the calves were weighed and fecal samples collected at days 7, 14, 21, 28, 35, and 42. Weighing was done using the heart girth method. The fecal samples collected in the field were carried into small portable coolers in individually labeled plastic bags for each calf. Fecal egg counts were performed according to the McMaster slide technique. Larval cultures were done on pooled feces at days 0, 21, 35, and 42 for identification of prevalent helminths.

Statistical analysis

The data collected was analyzed according to Cavier's method (1). Thus the percentage in fecal egg count reduction (FECR) was calculated using the formula $[(N-n)/N] \times 100$; where

N = average number of worm eggs at D0

n = average number of worm eggs at D21

The FECR percentage was calculated at D21 after treatment, as well as at other dates, to assess the anthelmintic effect of the plants (table I).

■ RESULTS

Fecal larval cultures at days 0, 21, and 35 indicated the presence of the following helminths: *Haemonchus* sp., *Trichostrongylus* sp., *Strongyloides papillosus*, *Bunostomum* sp., *Oesophagostomum* sp., and *Cooperia* sp.

Terminalia glaucescens (Bawshihi)

At D21 and at half dose, Bawshihi has shown no anthelmintic effect. However at full dose, it has demonstrated a fecal egg count reduction of 48.4%. There was thereafter an apparent increase in the fecal egg count in most of the treated groups, suggesting there was reinfestation since the calves were not kept indoors. Statistically there was a significant difference ($P < 0.05$) between the fecal egg counts in the two treatment groups. The results on the efficacy of this plant were different from those obtained with *Terminalia avicennoides*, which was found quite efficacious. (3).

Vernonia amygladina (Suwaaka)

Suwaaka has demonstrated anthelmintic efficacy for both dosages. Unlike Bawshihi there was a fluctuation in the FECR percentages during the observation period. At D21 and at full dose Suwaaka had a 52.4% FECR, compared to 49.6% at half dose. Suwaaka is highly recommended as an anthelmintic for use by farmers at a 0.5 l dose. There was a significant difference ($P < 0.05$) between the fecal egg counts of both treatment groups.

Solanum aculeastrum (Gitte-nai)

Like Suwaaka both doses of Gitte-nai have demonstrated anthelmintic efficacy with a fluctuation in FECR percentages at days 7, 14, 28 posttreatment. Gitte-nai had 36.2 and 34.4% FECRs at half and full doses, respectively, at D21. There was no significant difference ($P > 0.05$) in the fecal egg counts in both treatment groups. Gitte-nai at full dose seemed to have been very effective against digestive tract strongyles. FECR results obtained for this plant confirm those obtained in earlier work (7). A Gitte-nai treatment at full dose for two consecutive days could be recommended as an anthelmintic to farmers, while awaiting further evaluation with a controlled necropsy trial.

Table I
Effects of various plants on fecal egg count reductions

Plants		Day 0	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42
<i>Terminalia glaucescens</i>	A	6200	2500	4300	3200	8200	7800	9400
	%	-	59.7	30	48.4	0	0	0
	B	3000	3000	6900	6200	8300	8400	3500
	%	-	0	0	0	0	0	0
<i>Vernonia amygladina</i>	A	8200	6100	4000	3900	6400	1500	3600
	%	-	25.6	51.2	52.4	22	81.7	56.1
	B	13,700	7300	9500	6900	4500	7900	8500
	%	-	46.7	30.7	19.6	67.2	42.3	38
<i>Solanum aculeastrum</i>	A	42,700	38,800	33,500	28,000	36,400	2500	13,500
	%	-	9.1	21.6	34.4	14.8	94.2	68.4
	B	9400	4900	5000	6000	2100	4350	5600
	%	-	47.9	46.8	36.2	77.7	53.7	40.4
<i>Khaya anthotheca</i>	A	7700	2900	1500	3400	2900	4100	3900
	%	-	62.3	80.5	55.8	62.3	46.8	49.0
	B	2400	1600	2700	2000	3100	2300	3000
	%	-	33.3	0	16.7	29.3	4.2	0
Levamisole	C	5200	100	200	400	400	1400	0
	%	-	98.1	96.2	92.3	92.3	73.1	100
	D	5500	800	500	500	700	3600	2000
	%	-	85.5	90.9	90.9	87.3	34.5	63.6

A = full dose; B = half dose; C = Fundong; D = Jakiri; % = percentages in fecal egg count reductions

Khaya anthotheca (Kahi)

At half dose Kahi was effective as an anthelmintic for one week only; there was thereafter a fluctuation in the level of fecal egg counts. At full dose, it appears as a potent anthelmintic with a low residual effect as there was reinfestation at D21 posttreatment. With a fecal egg count reduction of 55.8% at D21, Kahi at a full dose of 0.51 on two consecutive days is considered efficacious. The initial 62.3% drop in the fecal egg count clearly testifies to the potency of Kahi as an anthelmintic. There was a significant difference ($P < 0.05$) between the fecal egg counts of both groups. The half-dose treatment results of Kahi confirm those obtained by other authors, i.e., 21% FECR at a dose of 5 g/kg live weight (3).

Levamisole

Using the recommended dose and administration method, levamisole was clearly the most efficacious anthelmintic when compared to the four indigenous anthelmintics. FECRs were 89.7 and 93.3% in Jakiri and Fundong, respectively.

■ DISCUSSION

In the present investigation covering the Fulani settlements of Jakiri, Sabga, and Fundong it can be suggested that some medicinal plants could serve as reliable therapeutic agents against helminthosis in traditional veterinary medicine practices. Some of these plants grow singly in the wild, making the task of locating them very tedious at times. Based on fecal egg counts, some of the plants can be recommended for use by farmers as anthelmintics while others require further investigation before a categorical

statement can be made about their anthelmintic efficacy (table I). The ineffectiveness of some of these plants and of some of the dosages could be attributed to a persistent reinfestation as pastures were highly contaminated with helminth eggs.

There is a need to research into the activity spectrum of these plants on various species of worms. This work was meant to be a screening trial. Thus, to confirm these preliminary results another test with necropsy procedures must be carried out.

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Résumé

Nfi A., Ndi C., Bayemi P.H., Njwe R., Tchoumboue J., Njakoi H., Mopoi N., Njakoi M., Sali-Django. L'efficacité anthelminthique de quelques plantes indigènes dans la province du Nord-Ouest au Cameroun

Des expériences ont été faites sur neuf groupes de huit veaux pour déterminer l'efficacité anthelminthique de quatre plantes indigènes : *Terminalia glaucescens*, *Vernonia amygladina*, *Solanum aculeastrum* et *Khaya anthotheca*. Des échantillons de fèces de veau ont été récoltés aux jours 0, 7, 14, 21, 28, 35 et 42 pour effectuer la numération des œufs par la technique sur lame de McMaster. Les résultats ont montré que *Solanum aculeastrum*, *Khaya anthotheca* and *Vernonia amygladina* étaient efficaces avec des réductions de l'excrétion des œufs respectivement de 34,4, 55,8, et 52,4 p. 100 à doses complètes, 21 jours après le traitement.

Mots-clés : Bovin - Veau - *Terminalia glaucescens* - *Vernonia amygladina* - *Solanum aculeastrum* - *Khaya anthotheca* - Anthelminthique - Efficacité - Cameroun.

Resumen

Nfi A., Ndi C., Bayemi P.H., Njwe R., Tchoumboue J., Njakoi H., Mopoi N., Njakoi M., Sali-Django. Eficiencia antihelmíntica de algunas plantas autóctonas en la provincia del Noroeste de Camerún

Se llevaron a cabo experimentos en nueve grupos de ocho terneros, con el fin de determinar la eficiencia antihelmíntica de cuatro plantas autóctonas, llamadas *Terminalia glaucescens*, *Vernonia amygladina*, *Solanum aculeastrum* y *Khaya anthotheca*. Se recolectaron muestras fecales de los terneros al día 0, 7, 14, 21, 28, 35 y 42, para conteos de huevos en heces mediante la técnica de lámina McMaster. Los resultados muestran la eficiencia de *Solanum aculeastrum*, *Khaya anthotheca* y *Vernonia amygladina*, con reducciones en los conteos de huevos en heces de 34,4, 55,8 y 52,4% respectivamente, a dosis completas, al día 21 post tratamiento.

Palabras clave: Ganado bovino - Ternero - *Terminalia glaucescens* - *Vernonia amygladina* - *Solanum aculeastrum* - *Khaya anthotheca* - Antihelmíntico - Eficacia - Camerún.