

NATURAL PRODUCTS MEDICINE USED FOR THE TREATMENT OF *TRYPANOSOMIASIS SPP.* IN NASARAWA STATE

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ABSTRACT

Rearing of ruminant animals improves the economy of a nation and also reduces unemployment rate. However, ruminant output is significantly impacted by parasitic diseases such as Trypanosomiasis spp. Natural products of plant origin have played significant role since time immemorial in combatting different diseases both in animals and humans. Hence, this study aimed to reveal the use of natural therapeutic plant products for the prevention and treatment of Trypanosomiasis spp. and promote sustainable livestock production. The study was carried out in the largest cattle market in Nasarawa state known as Shinge livestock market, Lafia. A well-structured questionnaire was used to collect data from 51 respondents and then analyzed statistically. A total number of eighteen (18) plant species were revealed by the respondent in which Khaya senegalensis was the most cited species. Potash was added to all the species cited for effectiveness. Stem bark (71.42%) and leaves (28.58%) were the part of plant used by the pastoralist interviewed and most used method of preparation were plundering and infusion. The study shows that the most common symptoms of affected animals are loss of weight (58.82%), alopecia (54.90%), diarrhoea (35.29%), skin infection (19.61%), tearing (17.65%) and loss of tail (11.76%). Many plants used in the treatment of trypanosomiasis by pastoralists were revealed. Biological properties of these plants, either single or combined, must be validated scientifically.

Keywords: Ruminants, Trypanosomiasis, Natural products, Medicinal plants, Nasarawa State

INTRODUCTION

Ruminant animals like cattle, goats and sheep are the major source of daily protein such as milk, yoghurt, meat and cheese globally. Ruminant breeding is extremely important from a socio-economic standpoint for livestock farmers in Nigeria especially those in Northern Nigeria. The livestock industry in Africa accounts for about 30- 80 % of the continent's agricultural economy (Erdaw, 2023). In 2024, Nigeria government created a new ministry named Federal Ministry of Livestock Development to focus on policies that will enhance increase in the production of livestock and their products. Rearing ruminant animals can improve the economy and also reduces unemployment rate. However, ruminant output is significantly impacted by parasitic diseases; these parasites can cause the infected animal to die or interfere with its growth and development. African trypanosomiasis commonly called Samore in Hausa and Fulani is a vector disease which attack ruminant animals for years. Annually, the mortality rate of calves increases to about 6-20% due to *Trypanosomiasis spp.* and calving rate decreases by 6–19% which makes it difficult to improve genetics and intensify animal production and makes it challenging to enhance genetics and boost animal output (Bouyer *et al*, 2014). There are reports on the trypanocidal resistance by animals from existing drugs (Mulandane *et al*, 2020; Unciti-Broceta *et al*, 2015 and Mungube *et al*, 2012), hence there is need for development of other forms of control.

Natural products of plant origin have played significant role since time immemorial in combatting different diseases both in animals and human. Globally, there is now focus on medicinal values of natural products (Adepoju *et al.*, 2024). Farmers resort to medicinal plants as a result of low cost, easy accessibility and safety when they take the animals out for grazing in the bush. In order to regulate trypanosomes in Nigerian ruminants, the current study aims to inventory the natural compounds of therapeutic herbs. The development of a novel trypanocidal medication that effectively combats animal trypanosomiasis may begin with these therapeutic plants. Thus, this work reveals the use of natural products of medicinal plants for the prevention and treatment of Trypanosomiasis spp. and promotes sustainable livestock production.

MATERIALS AND METHODS

Study Area

The study was carried out in the largest cattle market in Nasarawa state known as Shinge livestock market, Lafia. The market is well known for buying and selling cattle, sheep, goat and local chicken. Farmers from the villages and cities in the state and nearby states bring their animals for sale on Thursdays and Sundays. Lafia is located between latitudes 8°20'N–8°38'N and longitudes 6°34'E–7°30'E, Lafia local government Area, Nasarawa state, North Central, Nigeria. The market was selected for the survey due to the insecurity situation of the country; it is safer to access the livestock farmers at this location and it is evident that more than 85% livestock farmers in the state come on market days to either buy or sell their livestock. Also, farmers from neighbouring states which includes Kaduna state in the north; Plateau state and Taraba state in the east; Benue and Kogi state in the south and Federal Capital Territory (FCT); Abuja and Kogi state in the west (Binbol and Marcus, 2008) also bring their livestock due to the fact that Nasarawa State is at the central region of Nigeria.

Sample Size and Sampling Techniques

The number of sample (farmers) used for this study was determined by using Dagnelie formular:

$$n = \frac{[z^2 \times p(1-p)/e^2]}{1 + [z^2 \times \frac{p(1-p)}{e^2} \times N]} \dots [1]$$

Where n is the sample size, N is the average population of farmers who brought their livestock for selling in the market in two market days, z is the z-score at 1.96, p is the standard deviation at 0.5 and e is the margin error at 0.05.

Data Collection

Data collection took place between September and November 2024 using a well- structured questionnaire. The questionnaire was divided into two parts. The purpose of the first section was to gather data on the respondents' socio-demographic details, including gender, ethnicity, age, gender, education level, livestock experience, primary activity, etc. The second section focused on the anti-trypanocidal medicinal plants, this includes: local name of the disease, plant's name, parts used, preparation methods, routes of administration, dosage, duration of treatment. Most of the plants were mentioned by the informants in local language (Hausa/ Fulani) and were later researched for their common and scientific name form literatures.

Statistical Analysis

Data on socio-demographic information was subjected to descriptive analysis. The data collected on the plants were entered and arranged using Microsoft Excel® 2010.

RESULTS AND DISCUSSION

Respondents' Demographical characteristics

The total number of respondents is 51 and they were all male. Only 39 of them make use of medicinal plants that are anti-trypanocidal in nature. The respondents are majorly Fulani ethnic group (68.63%), followed by Hausa ethnic group (21.57%) and other ethnic groups (9.80%). The main occupation of the respondent was livestock farming (96.1%) while others are involved in treatment of livestock (3.9%). The survey also revealed the level of their formal education. The respondents with no education were 39.22%, primary school, secondary school and tertiary education were 17.65%, 27.45% and 15.69% respectively. Table 1 revealed the summary of the respondents' demographic information.

Symptoms of Trypanosomiasis

The study shows that the most common symptoms of affected animals are loss of weight (58.82%), alopecia (54.90%), diarrhoea (35.29%), skin infection (19.61%), tearing (17.65%) and loss of tail (11.76%). Most of the aforementioned symptoms were also reported by Iwaka *et al*, (2023).

Table 1: Demographic information of participants engaged in the study (n = 51).

Variables	Categories	Frequency	Percentage (%)
Ethnic group	Fulani (F)	35	68.63
	Hausa (H)	11	21.57
	Others	5	9.80
Age	21- 30	5	9.80
	31-40	16	31.37
	41-50	15	29.41
	51-60	9	17.65
	>60	6	11.76
Level of Education	Illiterate	20	39.22
	Primary	9	17.65
	Secondary	14	27.45
	Tertiary	8	15.69
Years of experience	11-15	4	7.84
	16-20	6	11.76
	21-25	19	37.25
	26-30	3	5.88
	>30	19	37.25

Medicinal Plants Used against Trypanosomiasis

Out of the 51 respondents, 76.47% use medicinal plants to treat or control Animal African Trypanosomiasis which shows usage of medicinal is a widespread practice in Nasarawa State. The survey revealed, that some depend on this method because they inherit the method from their parents, thus, it is their family heritage (46.15%) while some use the method because it is easily accessible especially during grazing period (10.25%) and others believe it is more effective than modern medicine (43.59%). The result shows that cattle are the most affected ruminant, however, they respond to treatment faster than other ruminants. A total number of eighteen (18) plant species were revealed by the respondents in which *Khaya senegalensis* was the most cited species. The pastoralists use stem bark (71.42%) more than leaves (28.58%) according to the survey. More than 95% of the method required addition of potash for proper action against the parasite as shown in Table 2.

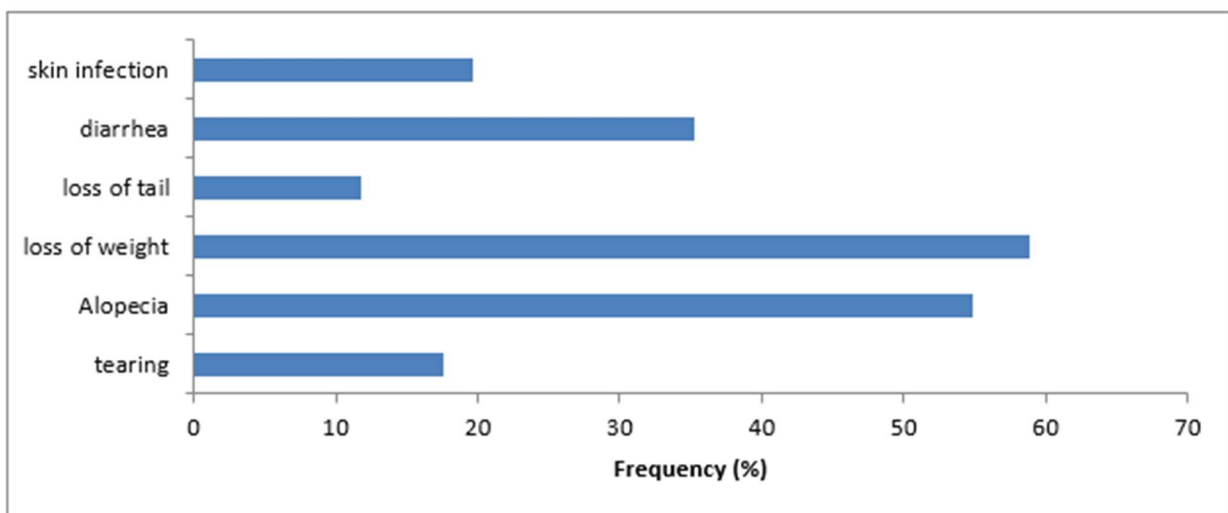


Figure 1: Symptoms of Trypanosomiasis in Ruminant

Table 2: Medicinal Plants Used in the Treatment of Trypanosomiasis in Nasarawa State

Common Name	Scientific Name	Family Name	Local Names	Freq	Used part	Admin	Method of preparation	Solvent
Neem	Acacia indica	Meliaceae	Dongoro (H), Darbeina (F)	6	Stem bark/leaves	Oral/topical	Decoction/Pulverized add potash and mixed with feed	Water/alcohol
African Mahogany	Khaya senegalensis	Meliaceae	Madaci (H), Kahi (F)	23	Stem bark	Oral	Infusion/Pulverized add potash and mixed with feed	Water
Bitter leaf	Ternstroemia amygdalina	Asteraceae	Shuvaka	1	Leaves	Oral	Infusion/powdered	Water
Pawpaw	Carica papaya	Caricaceae	Gwanda	2	Leaves	Oral	Infusion/Pulverized add potash and mixed with feed	Water
White onion	Allium cepa	Amaryllidaceae	Farin Albassa	1	Leaves	Oral	Pulverised, potash mixed with feed	
Baobab	Adansonia digitata L.	Maliaceae	Kuka (H), Maida kuruwa (F)	5	Leaves/stem bark	Oral	Pulverised, potash mixed with feed	
Frankincense tree	Boswellia dalzielii	Burseraceae	Arrarabi (H), manalele (F)	8	Leaves/stem bark	Oral	Infusion/Pulverized add potash and mixed with feed	Water
Locust bean tree	Parkia biglobosa	Fabaceae	Doruwa (H)	2	Stem bark	Oral	Pulverised, potash mixed with feed	
African copalba	Daniellia oliveri	Fabaceae	Kadawa (H)	4	Stem bark	Oral	Pulverised, potash mixed with feed	
balsam tree	Ficus sycamorus L.	Moraceae	Baure (H)	1	Leaves	Oral	Infusion	
Sycamore fig	Xylocarpus aethiopicus	Moraceae	Kimba dutse (H)	4	Stem bark	Oral	Infusion/Pulverized add potash and mixed with feed	
African pepper	Ceratoltheca sesamoides	Pedaliaceae	Gwingei (F)	4	Stem bark	Oral	Pulverised, potash mixed with feed	
Sesame weed	Vitellaria paradoxa	Sapotaceae	Namiji kade (H)	1	Stem bark	Oral	Pulverized, potash mixed with feed	
Shea tree	Jatropha curcas	Euphorbiaceae	Diaci (F)	2	Stem bark	Oral	Pulverised, potash mixed with feed	
Jatropha	Croscotera febrifuga	Rubiaceae	Rimajogochi (F)	5	Leaves/stem bark	Oral	Infusion/Pulverized add potash and mixed with feed	Water
Ordeal tree	-	-	Mayanole/Maxamhi (F)	13	Stem bark	Oral	Pulverised, potash mixed with feed	
Hackberry tree	Celtis integrifolia	Ulmaceae	Ganhi (F)	1	Stem bark	Oral	Pulverized and mixed with feed	
Garlic pear tree	Crataeva adansoni	Caenaceae	Lamdam mbaali (F)	5	Stem bark	Oral	Pulverized and mixed with feed	

Freq = Frequency; Admin = Administration

Potassium is an electrolyte that the body needs to function correctly, including blood volume, neuron and muscle function, and hydration. Profile scans of the anticipated Trypanosomes on complete set of proteins against the preserved pore loop of cation channels initially revealed that a potassium channel is a crucial plasma membrane transport system in Trypanosomiasis (Steinmann *et al.*, 2015). According to Tauheed *et al.*, (2020), potassium can have a positive effect on trypanosomiasis by improving packed cell volume and enhancing the anti-trypanosomal effects of certain plants.

Pulverized form was the most method of Preparation, followed by infusion and decoction. All the respondents used oral administration. Water is the mostly used solvent for the preparation of the natural products as shown in Table 2. This could be because water dissolves highly polar secondary metabolites such as alkaloids, flavonoids and phenolic compounds better than other solvents due to their ability to form hydrogen bonds with water molecules. Thus, highly polar secondary metabolites are responsible for anti-trypanocidal potentials of the cited plants.

CONCLUSION

The study revealed eighteen (18) plants that have anti-trypanocidal potentials by pastoralists in Nasarawa State. The respondents also revealed that the addition of potash will enhance the efficacy of these plants. Further study will commence on the Isolation and Characterization of the anti-trypanocidal compounds in some of these plants. Also, the biological properties of the species revealed must be validated scientifically.

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