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Short Communication

In vitro anti trypanosomal activity of some medicinal plants used in the treatment of trypanosomosis in Northern Nigeria

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The *in vitro* trypanocidal activity of 13 medicinal plants used by local herdsmen in Northern Nigeria for the treatment of trypanosomosis was investigated. Forty-four different extracts prepared from the 13 plants were screened for *in vitro* activity against *Trypanosoma brucei brucei.* Four of the extracts showed activity against the parasite at minimum concentration of 8.3 mg/ml of blood.

Key words: Medicinal plants, trypanosomosis, *Trypanosoma brucei brucei.*

INTRODUCTION

Trypanosomosis is one of the major obstacles to livestock production in Africa. Its eradication and control is principally based on chemotherapy and chemoprophylaxis. These measures are faced with problems. Limited and expensive drugs, toxicity due to long period of treatment and drug resistance are the major limitations to the chemotherapy and chemoprophylaxis as means of treatment for trypanosomosis (Gutteridge, 1985).

Herbal preparations for the treatment of several diseases still hold a strong position in rural areas. In Northern Nigeria where trypanosomosis is prevalent, traditional healers use medicinal plants either alone or in combination to treat both human and animal trypanosomosis. Because of the limitations of the present drugs, searching for active substances of natural origin is necessary. Moreso several semi-synthetic and synthetic drug derivatives were originally isolated from natural compounds (Cragg et al., 1997; Soerjato, 1996).

Recent efforts on ethnopharmacology revealed several of these medicinal plants as potential trypanocides (Asuzu and Chineme, 1990; Igwe and Onabanjo, 1989; Nok et al., 1993; Nok, 2002). In Northern Nigeria, many medicinal plants are used against animal trypanosomosis and the scientific information on the claimed efficacy of these plants are lacking. It was on this account that this work was designed to document these ethnoveterinary practices among the local herdsmen and ascertain their efficacy *in vitro* against *Trypanosoma brucei brucei*, a common parasite found around the area.

MATERIALS AND METHODS

Plant materials

The plants (Table 1) screened were collected from around Adamawa, Taraba and Gombe States of Nigeria. They were identified at the herbarium unit of Biological science department, Ahmadu Bello University, Zaria.

Preparation of the extracts

Each of the plant part screened was dried and ground into powder. Exactly 100 g of the powder was dissolved in 400 ml of methanol or water. The filtrate obtained was concentrated on a water bath at 50^{o}C.

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Table 1. Plants and the parts screened for the *in vitro* activity.

Plant name	Family	Parts screened	Type of extract	*In-vitro* activity
Cassia sieberiana	*Leg: Caesalpinoidege*	Roots, bark and leaves	H_20 and MeoH	-
Xeminia ameriana	*Olacaceae*	Roots and leaves	H_20 and MeoH	-
Ziziphus spinachristi	*Rhamnaceae*	Bark and leaves	H_20 and MeoH	-
Ziziphus abyssinica	*Rhamnaceae*	Roots and leaves	H_20 and MeoH	-
Guira senegalensis	*Combretaceae*	Roots, bark and leaves	H_20 and MeoH	+ roots (H_20 extracts)
Maytenus Senegalensis	*Celastraceae*	Roots and leaves	H_20 and MeoH	-
Albezia Lebeck		Leaves and seeds	H_20 and MeoH	-
Cassia siamaelam	*Leg: Caesalpinoideae*	Roots, bark and leaves	H_20	-
Tamarindus indica	*Leg: Caesalpinoideae*	Roots, bark and leaves	H_20	+ (Leaves)
Lawsonia inermis	*Lythraceae*	Roots and leaves	H_20	-
Balanites aegyptiaca	*Balanitaceae*	Bark	H_20	-
Khaya senegalensis	*Meliaceae*	Bark	H_20 and MeoH	+ (H_20 and MeoH)
Vernonia amygdalina	*Compositae*	Leaves	H_20	-

MeoH: methanolic extract
H_20: Aqueous extract
+: Active
-: Inactive

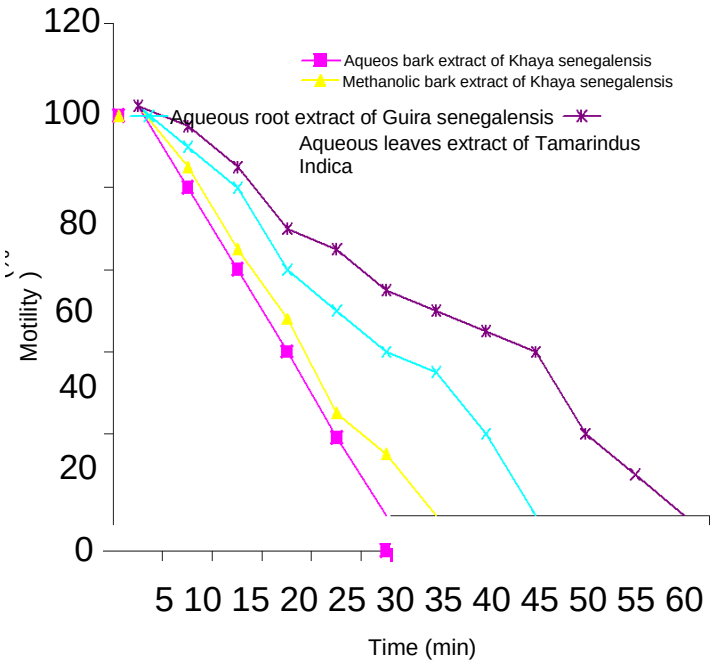

Figure 1. Graph of incubation time against motility of the parasites for the four active extracts at concentration of 8.3 mg/ml of blood.

Trypanosome

Trypanosoma brucei brucei (Federe strain) was obtained from NITR, VOM, Jos, Nigeria. Blood harvested from a donor rat at peak parasitaemia (10^7 parasites/ml of blood) was used.

In vitro Screening

Five percent of each of the crude extract was prepared. Aliquots of 10∝L the extract was incubated with 60∝*l* of infected blood in wells of micro-titre plates. For control, the 10*µl* extract was replaced with phosphate buffer saline in the wells of the microtitre plates. Motility was observed under the microscope (X400) at five min intervals for one hour.

RESULTS

The table shows all the plants screened for the *in vitro anti-trypanosomal* activity. Only four extracts from three plants showed activity against the parasite. Aqueous extract of the bark of *khaya senegalensis* showed the highest activity. Here all the parasites were immotile within 30 min of incubation. The *in vitro* activity of aqueous leaf extracts of *Tamarindus indica* was less effective compared to the other active extracts. There was no *in vitro* activity observed from both methanolic and aqueous extracts of seeds and leaves of A*lbizia lebbeck* even at 100%.

DISCUSSION

The result of the present study showed that three plants out of the 13 screened had activity against *T.b. brucei*. This finding confirms the efficacy of some of the plants which are used by local herdsmen in the treatment of animal trypanosomosis. *In vitro* activity of crude plant extracts provides evidence to support the use of such plants. The extracts which lack *in vitro* activity in the present study, may show anti trypanosomal activity after oral administration in an animal model where bio-transformation of plant materials may convert inactive precursor molecules to active ones. In the present study it was only *T.b. brucei* that was used. This may not be the main prevalent parasite in areas where the local

herdsmen take their cattle for grazing. It is thus possible that the plants that did not show activity in this study may have activity against other subspecies of the parasites. For instance, it has been reported that *T. gambiense* and *T. rhodiense* have different susceptibility for eflornithine (DFMO), a commercial drug used against human trypanosomosis (Iten et al., 1993). Also the mode of extracts preparation and the period the plant materials were collected could in part be responsible for the inactivity observed.

Although bioactive screening *in vitro* remains a useful method for pre-selection of plants and bioassay- guided fractionation for the isolation and identification of active principles, it should not be the only criterion. *In vivo* studies should be carried out to obtain additional evidence for the presence of bioactive principles.

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