Short Communication

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

WUROCHEKKE A.U.¹ and NOK A.J.²*

¹Biochemistry Department, Federal University of Technology, Yola, Nigeria.
²Biochemistry Department, Ahmadu Bello University, Zaria, Nigeria.

Accepted 2 April, 2004

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

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Family</th>
<th>Parts screened</th>
<th>Type of extract</th>
<th>In-vitro activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cassia sieberiana</td>
<td>Leg: Caesalpinioidege</td>
<td>Roots, bark and leaves</td>
<td>H₂O and MeoH</td>
<td>-</td>
</tr>
<tr>
<td>Xeminia ameriana</td>
<td>Olacaceae</td>
<td>Roots and leaves</td>
<td>H₂O and MeoH</td>
<td>-</td>
</tr>
<tr>
<td>Ziziphus spinachristi</td>
<td>Rhamnaceae</td>
<td>Bark and leaves</td>
<td>H₂O and MeoH</td>
<td>-</td>
</tr>
<tr>
<td>Ziziphus abyssinica</td>
<td>Rhamnaceae</td>
<td>Roots and leaves</td>
<td>H₂O and MeoH</td>
<td>-</td>
</tr>
<tr>
<td>Guira senegalensis</td>
<td>Combretaceae</td>
<td>Roots, bark and leaves</td>
<td>H₂O and MeoH</td>
<td>+ roots (H₂O extracts)</td>
</tr>
<tr>
<td>Maytenus Senegalensis</td>
<td>Celastraceae</td>
<td>Roots and leaves</td>
<td>H₂O and MeoH</td>
<td>-</td>
</tr>
<tr>
<td>Albezia Lebeck</td>
<td></td>
<td>Leaves and seeds</td>
<td>H₂O</td>
<td>-</td>
</tr>
<tr>
<td>Cassia siamaelam</td>
<td>Leg: Caesalpinioidege</td>
<td>Roots, bark and leaves</td>
<td>H₂O</td>
<td>-</td>
</tr>
<tr>
<td>Tamarindus indica</td>
<td>Leg: Caesalpinioidege</td>
<td>Roots, bark and leaves</td>
<td>H₂O</td>
<td>+ (Leaves)</td>
</tr>
<tr>
<td>Lawsonia inermis</td>
<td>Lythraceae</td>
<td>Roots and leaves</td>
<td>H₂O</td>
<td>-</td>
</tr>
<tr>
<td>Balanites aegyptiaca</td>
<td>Balanitaceae</td>
<td>Bark</td>
<td>H₂O</td>
<td>-</td>
</tr>
<tr>
<td>Khaya senegalensis</td>
<td>Meliaceae</td>
<td>Bark</td>
<td>H₂O and MeoH</td>
<td>+ (H₂O and MeoH)</td>
</tr>
<tr>
<td>Vernonia amygdalina</td>
<td>Compositae</td>
<td>Leaves</td>
<td>H₂O</td>
<td>-</td>
</tr>
</tbody>
</table>

MeoH: methanolic extract
H₂O: Aqueous extract
+: Active
-: Inactive

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 *Albizia 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 efornithine (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.

REFERENCES


