Afr. J. Trad. CAM (2005) **2 (2):** 129 - 133

Afr. J. Traditional,
Complementary and Alternative Medicines
www.africanethnomedicines.n

Research Paper

ISSN 0189-6016©2005

ANTICESTODAL EFFICACY OF FOLKLORE MEDICINAL PLANTS OF NAGA TRIBES IN NORTH-EAST INDIA

Temjenmongla and Arun Kumar Yadav*

Department of Zoology, North-Eastern Hill University,
Shillong 793022, India
Email: akynehu@hotmail.com

Abstract

The anticestodal efficacy of nine plants that are used in the indigenous system of medicine by Naga tribes in north-east India to cure intestinal-helminth parasitic infections was tested employing *Raillietina echinobothrida*, a tapeworm of poultry, as a model test parasite. The study revealed that the leaves of *Psidium guajava*, *Houttuynia cordata* and stalk of *Lasia spinosa* possess a profound anticestodal efficacy as evident by the mean mortality time of *R. echinobothrida* which ranged from 1 to 3.66 hrs, following exposure to 5 - 40 mg/ml concentration of these plant extracts. Moderate activity was recorded for the leaves of *Clerodendrum colebrookianum*, *Lasia spinosa* and *Centella asiatica*, while *Curcuma longa*, *Cinnamomum cassia*, *Gynura angulosa*, *Lasia spinosa* (stem) and *Aloe vera* revealed a negligible degree of anticestodal activity.
Keywords: Anticestodal Efficacy, Naga Tribes, India, *Raillietina echinobothrida.*

Introduction

The traditional medicines hold a great promise as source of easily available effective anthelmintic agents to the people, particularly in tropical developing countries, including India. It is in this context that the people consume several plants or plant-derived preparations to cure helminthic infections (Akerele, 1990; Satyavati, 1990). The origin of many effective drugs is found in the traditional medicine practices and in view of this several workers have undertaken studies pertaining to testing of folklore medicinal plants for their proclaimed anthelmintic efficacy (Yadav *et al*., 1992; Roy and Tandon, 1999; Sukul *et al*., 1999; Al-Qarawi *et al*., 2001; Githiori *et al*., 2002; Tangpu and Yadav,

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2003; Tangpu *et al*., 2004). Investigations on the anthelmintic activity of plants namely - *Mallotus phillippensis lam, Cardiospermum halicacabum, Ocimum sanctum, Trifolium repens*, have revealed them to be significantly efficacious against helminth parasites infections (Singh *et al*., 1997; Khunkitti *et al*., 2000; Asha *et al*., 2001; Tangpu and Yadav, 2004). In the present study we report the anticestodal efficacy of some folklore medicinal plants of Naga tribes in north-east India, using *Raillietina echinobothrida*, a tapeworm of poultry, as a model test parasite.

Materials and Methods

Preparation of Plant Extracts:

The plants that were tested for their anticestodal activity are listed in Table 1. The selection of these plants was made on the basis of information gathered about their use in the traditional medicine system by local traditional healers in the Nagaland state. The plant materials were collected from different places in Nagaland State and duly identified by Dr. Y. Kumar, Plant Taxonomist, Department of Botany, NEHU, Shillong. A voucher specimen of each plant was deposited in the herbarium collection at Department of Zoology, NEHU, Shillong. The plant materials were dried under shade, grounded into powdered form and extracted with ethanol and ethyl acetate (*Curcuma longa*) using Soxhlet extractor (Gafner *et al*., 1985). The extract was concentrated *in vacuo* and the residue was dried over anhydrous calcium chloride and stored at -4^0 C until use.

Testing of Plant Extracts:

Live specimens of adult *R. echinobothrida* were collected in 0.9% phosphate buffered saline (PBS, pH 7.3) from intestines of freshly necropsied domestic fowl (*Gallus gallus domesticus* L.). The test parasites were maintained in Hank's solution at 37 ± 2^O C inside an incubator. The plant extracts were dissolved in a few drops of 1 % Dimethyl Sulphoxide (DMSO), and tested at 5, 10, 20 and 40 mg/ml concentrations. In each case, a set of worms maintained without plant extract but having a few drops of 1 % DMSO in Hank's solution served as negative controls. The anticestodal efficacy of plant extracts was adjudged in terms of the motility and mortality of the test parasites and was monitored at regular time-intervals. The mortality of parasites was confirmed by removing the plant-extract treated/control parasites from Hank's solution and dipping them in slightly warm water. The mortality of parasite was assumed to have occurred when all signs of movements had ceased.

Results and Discussion

Table 2 summarizes the effects of plant extracts on mortality time of test parasite, *R. echinobothrida*. The worms incubated in the control medium showed physical activity

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for about 69.00 hours. The mean survival time of the reference praziquantel-treated worms recorded for 5 and 10 mg/ml concentrations was 2.34 and 1.67 hrs, whereas the same was

Table 1: List of plants tested for anticestodal efficacy.

Plant Species	Family	Local name	Plant part tested
1. *Houttuynia cordata* Thumb Voucher No. (AKY/003)	Piperaceae	Mokma	Leaves
2. *Lasia spinosa* Linn Voucher No. (AKY/002)	Araceae	Jurang	Leaves, stalk, stem
3. *Centella asiatica* Linn Voucher No. (AKY/004)	Apiaceae	Longsokorok	Leaves
4. *Clerodendrum colebrookianum* Walp Voucher No. (AKY/005)	Verbenaceae	Orema	Leaves
5. *Gynura angulosa* DC Voucher No. (AKY/006)	Asteraceae	Ensu	Leaves
6. *Aloe vera* Linn Voucher No. (AKY/007)	Liliaceae	Aing naro	Leaves
7. *Psidium guajava* Linn Voucher No. (AKY/001)	Myrtaceae	Modiram	Leaves
8. *Curcuma longa* Linn Voucher No. (AKY/008)	Zingiberaceae	Nakong	Rhizomes
9. *Cinnamomum cassia* Presl Voucher No. (AKY/009)	Lauraceae	Shingja	Bark

found to be 1.34 and 0.84 hrs for 20 and 40 mg/ml concentrations. Out of different plant extracts tested, *P. guajava, H. cordata* and *L. spinosa* (stalk) showed a profound anticestodal activity as revealed by the mean mortality time of parasites which varied between 1.00 to 3.66 hrs as compared to the standard drug PZQ where it varied between 0.84 to 2.34 hrs. The extracts of *C. colebrookianum, L. spinosa* (leaves) and *C. asiatica* showed a moderate level of efficacy as adjudged by mean mortality time of parasites which ranged from 4 to 14.66 hrs (Table 2). However, the mean mortality time of test parasite in case of treatment with extracts of *C. longa, C. cassia, G. angulosa, L. spinosa* (stem) and *A. vera* varied from 6.00 to 67.00 hrs. In a related study on medicinal plants of Naga tribes, we also observed an equally comparable efficacy of leaf extract of *P. guajava, C. asiatica* and *L. spinosa* (stalk) against a filarial parasite, *Setaria cervi*

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Table 2: Anticestodal efficacy of plant extracts against *R. echinobothrida, in vitro.*

PLANT/PLANT PARTS	Mean mortality time of *R. echinobothrida* at different concentrations of plant extract			
	5 mg/ml	**10 mg/ml**	**20 mg/ml**	**40 mg/ml**
Psidium guajava (leaves)	2.00±0.00	2.00±1.00	1.00±0.00	1.00±0.00
Houttuynia cordata (leaves)	3.00±0.00	3.00±1.00	3.00±1.73	2.00±0.00
Lasia spinosa (stalk)	3.66±0.57	2.33±0.57	2.00±1.00	2.00±1.00
Clerodendrum colebrookianum (leaves)	9.00±1.73	7.00±2.60	4.00±0.00	4.00±1.00
Lasia spinosa (leaves)	13.00±1.00	7.66±1.52	5.30±2.51	4.33±0.57
Centella asiatica (leaves)	14.66±1.15	9.00±1.00	6.00±2.00	5.00±1.73
Curcuma longa (leaves)	20.00±3.00	14.70±1.50	7.30±2.50	6.00±0.00
Cinnamomum cassia (bark)	24.70±0.60	20.00±2.00	14.00±4.40	8.70±2.10
Gynura angulosa (leaves)	38.00±1.00	36.30±0.60	34.00±0.00	34.00±2.00
Lasia spinosa (stem)	41.00±0.00	30.00±2.64	20.66±1.15	14.00±1.00
Aloe vera (leaves)	67.00±3.60	51.70±3.10	42.00±0.57	37.00±1.00
PRAZIQUANTEL	2.34±0.58	1.67±0.76	1.34±0.29	0.84±0.29
CONTROL*	69.00±1.15			

*Data represent mean values ± SD of mortality (h) for eleven experiments

(Temjenmongla and Yadav, 2003). In contrast, unlike in the present study the efficacy of *H. cordata* was found to be quite insignificant against *S. cervi*. This indicates that the anticestodal efficacy of plants differs with respect to different groups of helminth parasites. In conclusion, the results indicate that of the various plants used in folk-medicine system of Naga tribes to "cure" helminthic infections not all possess the anticestodal efficacy as acclaimed by the people.

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Acknowledgement

Partially financial support under the University Grants Commission's DRS-III Programme in the Department of Zoology, NEHU, Shillong to carry out this study is gratefully acknowledged.

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