

Research Article

EVALUATION OF ANTHELMINTIC ACTIVITIES OF RUMEX ABYSSINICUS JACQ AND RUMEX NERVOSUS VAHL. (POLYGONACEAE)

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ABSTRACT

Helminthiasis is a disease in which a part of the body is infested with worms such as pinworm, roundworm or tapeworm. Typically, the worms reside in the gastrointestinal tract but may also burrow into the liver and other organs. *Rumex abyssinicus* Jacq and *Rumex nervosus* Vahl (polygonaceae) is a large annual herb up to 4m high, leaves usually sagittate, inflorescence much branched, leafless panicle, nut light brown. These plants called in Amharic as Mekmako. *Rumex abyssinicus* as well as *Rumex nervosus* of the roots tested for anthelmintic activities. When tested *in vitro*, showed potent anthelmintic activity on the earthworm, *Pheretima posthuma*. Methanolic extract of *Rumex abyssinicus* were more active than its aqueous extract ($p < 0.001$), while methanol extract of *Rumex nervosus* also more potent than the aqueous extract. Piperazine citrate (20mg/ml) was used as a reference standard.

Keywords: Helminthiasis, *Rumex abyssinicus*, *Rumex nervosus*, anthelmintic activities.

INTRODUCTION

Helminthiasis is a disease in which a part of the body is infested with worms such as pinworm, roundworm or tapeworm. Typically, the worms reside in the gastrointestinal tract but may also burrow into the liver and other organs.

Different types of helminthiasis is believed to be endemic in many parts of the world, where there is poor sanitation, poor living conditions,, poor hygiene, poor malnutrition, poor health education, and crowded living conditions. The treatment of helminthiasis is of great practical importance.

Rumex abyssinicus Jacq and *Rumex nervosus* Vahl (polygonaceae) is a large annual herb up to 4m high, leaves usually sagittate, inflorescence much branched, leafless panicle, nut light brown. These plants called in Amharic as Mekmako.

Indigenous use: gonorrhoea, lung T.B, leprosy, fever, liver disease, hypertension, haemorrhoids, scabies, antiemetic, aphrodisiac, cough, rabies, rheumatism and migraine. Decoction of leaf or root powder taken as vermifuge. Root powder paste with lime juice applied for *Tinea nigra*, *T. versicolor*. If eaten in large quantities, could produce toxic effect because of their oxalate contents¹.

Pharmacological activity: methanolic extract was found to be active against *Nisseria gonorrhoea*². Chrysophanic acid is fungicidal and very effective in inhibiting dermatophyte growth³.

Active constituents: anthraquinones, aloe-emodin, emodin and physcion have been isolated from most species of genus. Anthraquinones are purgative⁴.

Rumex abyssinicus roots were used as diuretic and analgesic activity, anti-microbial, anti-inflammatory

activity^{5,6}. *Rumex nervosus* roots used as anti-microbial and anti-inflammatory activity⁶.

Chemotherapy is the only treatment and effective tool to cure and control helminth infection Indiscriminate use of synthetic drugs can lead to resistance of parasites⁷. Herbal drugs have been in use since ancient times for the treatment of parasitic disease in human and could be of value in preventing the development of resistance^{8,9}. As a step in this direction we focused our attention on search of herbal remedy and selected two medicinal plants named *Rumex abyssinicus* and *Rumex nervosus* of the roots was tested for anthelmintic activities.

MATERIALS AND METHODS

Plant Material Collection:

Rumex abyssinicus as well as *Rumex nervosus* roots was collected from the Oroma region, in the month of July 2010 and authenticated by the taxonomist, Dept of Botany, Jimma University and the specimen voucher was preserved in the herbarium.

Tested material:

Aqueous extract (3.50%) and methanol (5.25%) extract from roots of *Rumex abyssinicus* as well as aqueous (2.75%) and methanol (4.90%) extract from roots of *Rumex nervosus*.

RESULTS

Studied activity:

Anthelmintic activity was evaluated for both *Rumex abyssinicus* and *Rumex nervosus* separately. The activity was tested according to method discussed in detail by Kailasaraj and Kurupa¹⁰. *Pheretima posthuma* (Earthworm obtained from Agriculture Department) of nearly equal



size (9±1cm) were selected for present study due to its anatomical and physiological resemblance with round worm parasites of human beings^{11,12}.

Six earthworms of nearly equal size were placed in each Petri dish at room temperature. The time taken to complete paralysis and death were recorded. The mean paralysis time and mean lethal time for each sample were recorded. Piperazine citrate (20mg/ml) was used as reference standard.

Statistical Analysis:

The results were analyzed for statistical significance using one-way ANOVA followed by student t-test. Difference at P<0.001 was considered significant.

Aqueous and methanolic extracts of *Rumex abyssinicus* roots (Table 1) and the aqueous and methanolic extracts from roots of *Rumex nervosus* (Table 2) showed concentration-dependent anthelmintic activity against earthworms. *Rumex nervosus* showed significant effects (p<0.001) at the tested concentrations (100mg/ml) as determined by the paralysis time and death time (Table 2). The methanol extract was more effective in causing death of worms at all concentrations than aqueous extract at 99.98% significant level.

Table 1: Effects of *Rumex abyssinicus* root extracts on earthworms

Extracts (mg/ml)	Paralysis time (min) (Aqueous extract)	Death time (min)	Paralysis time (min) (Methanol extract)	Death time (min)
20	305±3.17	330±2.40	185±4.16	197±5.29
40	260±2.96	281±8.11	148±3.00	166±9.32
80	192±5.83	215±6.35	116±2.98	130±1.00
100	146±6.16	162±5.22	98±7.87	110±8.40
	Piperazine citrate Paralysis time			
20	30±2.00	80±8.24

Each value represents mean ±SEM (N=6).

P<0.001 significantly different compared with reference compound, piperazine citrate, student's t-test.

Table 2: Effects of *Rumex nervosus* root extracts on earthworms

Extracts (mg/ml)	Paralysis time (min) (Aqueous extract)	Death time (min)	Paralysis time (min) (Methanol extract)	Death time (min)
20	322±1.08	348±6.04	210±1.90	235±4.62
40	275±2.55	290±3.02	174±5.56	192±6.20
80	206±6.05	225±4.11	128±8.32	140±1.44
100	154±2.92	170±11.00	112±7.03	125±1.65
	Piperazine citrate Paralysis time			
20	30±2.00	80±8.24

Each value represents mean ±SEM (N=6).

P<0.001 significantly different compared with reference compound, piperazine citrate, student's t-test.

CONCLUSION

Rumex abyssinicus methanol extract was more effective at lower concentrations in causing paralysis and death of earthworms than aqueous extract (p, 0.001, Table 1). At concentrations of 80mg/ml and 100mg/ml, aqueous and methanol extracts of *Rumex abyssinicus* were equipotent (p,0.001) only in paralyzing the worms, while the methanol extract was significantly more potent than the aqueous extract in the death time. Reported in Table 1.

Nevertheless, activities of extracts of the two plants investigated on the earthworms were lower than that of the reference compound, piperazine citrate. This report is the first documentation on the anthelmintic activity of *Rumex nervosus* as well as *Rumex abyssinicus*. It may be

worthwhile to test the compounds previously isolated from these two plants.

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