

ANTHELMINTIC ACTIVITY OF *Cissus quadraangularis* Linn Stem

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### Summary

The present study reports anthelmintic activity of various extracts obtained from the stem of *Cissus quadraangularis* Linn (Vitaceae) against adult earth worms *Pheretima posthuma*. Among all the extracts tested at 20 mg/ml concentration, methanol extracts showed better anthelmintic activity when compared with the standard drug albendazole.

**Key words:** *Cissus quadraangularis* Linn; anthelmintic, *Pheretima posthuma*; methanol extract; albendazole.

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### Introduction

Helminth infections are among the most common infections in man, affecting a large proportion of the world's population. In developing countries, they pose a large threat to public health and contribute to the prevalence of malnutrition, anemia, eosinophilia and pneumonia<sup>1</sup>. Though there is treatment by chemicals/ drugs in the developed countries but still in developing countries, it is due to the cost and other factors, there is need for better and cheaper treatments. Plants can be a better alternative as they have nutritive value as well as possess number of pharmacological activities with fewer side effects<sup>2</sup>. *Cissus quadraangularis* has number of traditional uses yet its activities are not explored fully. The stout fleshy quadrangular one of the most widely used NSAIDs, damages stem of *C. quadrangularis*, is an edible plant found gastrointestinal mucosa by irritant action, causing throughout the hotter parts of India, Malaya, West alterations in mucosal permeability and/or Africa and Ceylon<sup>3</sup>. The stem is used for the suppression of prostaglandin synthesis<sup>4</sup>. treatment of eye and ear diseases, irregular menstruation, asthma, piles, tumours, fractures of Plant extracts are attractive sources of new bones, wounds and scurvy<sup>5</sup>. Previous studies drugs and have been shown.

To produce promising results revealed that this plant possesses analgesic<sup>6</sup>, antioxidant<sup>7</sup> and fracture healing property<sup>8</sup>. The analysis showed that the stem of *C. quadrangularis* contains 398 mg of vitamin C, 267 mg of b-carotene and 0.73 per cent of calcium<sup>9</sup>. The stem has been used in the treatment of stomach ulcer and dyspepsia in traditional systems of medicine in India<sup>10</sup>, which make it a potential antiulcer drug for evaluation, Preliminary studies have shown that *C. quadrangularis* extract (CQE) is well known to stimulate cell proliferation, gastric mucus synthesis and secretion in indomethacin-induced gastric ulcer model<sup>11</sup>. Phytochemical analysis of *Cissus quadrangularis* revealed a high content of ascorbic acid, carotene, phytosterol substances, and calcium,<sup>12</sup> and there are reports of the presence of  $\beta$ -sitosterol,  $\delta$ -amyrin, and  $\delta$ -amyrone.<sup>13</sup> All of these components have potentially different metabolic and physiological effects.<sup>14-16</sup> In the present study, our aim was to evaluate the anthelmintic potential of the different extracts of the leaves of *Cissus quadrangularis* against adult earthworm *Pheretima posthuma* to justify the traditional claim.

### Materials and methods Plant material

*Cissus quadrangularis* Linn. stem were collected & authenticated from Dr. Harish, botanist, Alva's education Foundation(R) Alvas health centre complex Moodbidri-574227, D.K. A voucher specimen was deposited in the herbarium of Department of Pharmacognosy, The Oxford College of Pharmacy, Bangalore.

### Drugs and Chemicals

The following drugs and chemicals were used. Albendazole (Bandy Mankind Pharma Ltd., New Delhi). All organic solvents and chemicals were purchased from S D Fine Chemicals Ltd., Mumbai and were of analytical grade.

### Preparation of extracts

Air dried powder of *Cissus quadrangularis* Linn. stem were coarsely powdered and subjected to successive solvent extraction by continuous hot extraction (soxhlet). The extraction was done with different solvents in their increasing order of polarity such as petroleum ether (60-80<sup>o</sup> C), chloroform, acetone, methanol and water. Each time the marc was air dried and later extracted with other solvents. All the extracts were concentrated by distilling the solvent in a rotary flash evaporator. The yield was found to be 10.53, 8.8, 2.63, 1.67, 4.04 and 6.26% w/w with reference to the air dried powder.

### Preliminary phytochemical screening

The coarse powder of *Cissus quadrangularis* Linn. stem (25g) was subjected to successive extraction with different solvents in their increasing order of polarity from petroleum ether (60<sup>o</sup>-80<sup>o</sup> C), benzene, chloroform, acetone, methanol and water. The extracts were concentrated and subjected to various chemical tests to detect the presence of different phytoconstituents<sup>17</sup>.

### Earthworms

Indian adult earthworms (*Pheretima posthuma*; Annelida, Megascolecidae) collected from moist soil and washed with normal saline to remove all matters were used for all study. The earthworm of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings<sup>18, 19</sup>.

### Anthelmintic activity

The anthelmintic activity was evaluated as per the method of Dash et al with slight modification<sup>19</sup>. The extracts were suspended in Tween 80 (0.1%) in normal saline. All the drugs and extracts were prepared freshly before starting the experiment. Eleven groups of six earthworms each were released into 10 ml of desired formulation as follows; vehicle (Tween 80 (0.1%) in normal saline, Albendazole (40 mg/ml), petroleum ether, benzene, acetone, chloroform, methanol and aqueous extract (20 mg/ml, each) in Tween 80 (0.1 %) in normal saline. Observation was made for the time taken to paralysis and death of individual worms up to 4 hrs of the test period. Paralysis was said to occur when the worms did not revive even in normal saline. Death was concluded when the worms lost their motility followed by fading away of their body colors<sup>20</sup>.

### Results and Conclusions

The results of the anthelmintic activity are given in the Table 1.

**Table 1: ANTHELMINTIC ACTIVITY OF *Cissus quadraangularis* Linn Stem**

Drug tested	Concentration (mg/ml)	Paralysis time (min)	Death time (min)
Vehicle (Tween 80 (0.1%) in normal saline)	---	----	----
Albendazole	40	305± 0.58	245 ± 0.91
Pet ether extract	40	65 ± 0.75	180 ± 0.66
Benzene extract	40	55 ± 0.35	180 ± 0.53
Acetone extract	40	45 ± 0.29	60 ± 0.46
Chloroform extract	40	40 ± 0.38	60 ± 0.78
Methanol extract	40	20 ± 0.35	30 ± 0.68
Aqueous extract	40	25 ± 0.59	41 ± 0.71

Results are expressed as mean ±SD of six determinations; Vehicle worms were alive up to 24 hrs of observation. From the Table, it is very clear that methanol, chloroform and aqueous extracts showed better anthelmintic activity when compared with standard drug at the same concentration. Methanol extract took the least time to cause paralysis and death of the worms followed by chloroform and aqueous extract respectively. Petroleum ether and acetone extract tested also showed anthelmintic activity when compared with albendazole. Preliminary phytochemical screening of different extracts showed the presence of alkaloids, tannins, saponin, flavonoids, steroids and glycosides. These phytoconstituents may be responsible for the anthelmintic activity. These results may lend support for the traditional use of the plant. Further investigation is needed for the phytoconstituents responsible for anthelmintic activity.

### Acknowledgement

The authors wish to thank Chairman and Executive Director of Children's Education Society and Acharya Narendra Dev Siksha Samiti for the facilities provided for the study.

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