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INVESTIGATION ON *IN VITRO* ANTHELMINTHIC ACTIVITY OF *CAPPARIS SEPIARIA* L. PLANT PARTS

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ABSTRACT

Capparis sepiaria L. belongs to the family Capparidaceae, is a profusely branched hedge plant with slender prickly shrub with zigzag stem, which is known as 'Himsra' in Ayurveda with multitherapeutic properties. Plant based medicines are very effective against many human infectious diseases either by paralysing or killing the pathogen. In the present study *C. sepiaria* stem bark, root bark materials were investigated for *in vitro* anthelmintic activity on adult earthworms *Pheretima posthuma* due to their anatomical and physiological resemblance with the intestinal roundworm parasite of human beings. Alcoholic and methanolic extracts at 5, 10 and 15 mg of concentrations are taken for the study. *Albendazole* is used as reference standard drug and Distilled water is used as negative control. The study revealed that both alcoholic and methanolic extracts showed significant paralysis and death when compared with the standard drug. Methanolic root bark extract is more significant at 5 mg conc. with mean paralysis time at15.03 minutes and mean death time at 19.6 minutes when compared to the standard with mean paralysis time of 90.9 and minutes and mean death time at 110.1 minutes respectively.

KEYWORDS: Anthelmintic activity, *Capparis sepiaria*, Phytochemicals, *Pheretima posthuma.*

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, anaemia, eosinophilia and pneumonia. Although the majority of infections due to worms are generally limited to

tropical regions, they can occur to travellers who have visited those areas, and some of them can be developed in temperate climates. Parasitic diseases causing severe morbidity like lymphatic filariasis (a cause of elephantiasis) and schistosomiasis. Most diseases caused by the helminths are of a chronic and debilitating in nature; they probably cause more morbidity and greater economic and social deprivation among humans and animals than any single group of parasites. The parasitic gastroenteritis is caused by mixed infection with several species of stomach and intestinal worms, which results in weakness, loss of appetite, decreased feed efficiency, reduced weight gain and decreased productivity.[1] Synthetic anthelmintics usage can produce side effects and can lead to resistance of the parasitic worms. 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.[2]

C. sepiaria L. is having high medicinal uses like to cure skin diseases (eczema, scabies), swellings, fever, inflammation, rheumatic pains, herpes virus infection, tuberculosis, filariasis.[3,4,5] Leaves with antidiabetic, anthelmintic activity[6, 7], stem and root with Hepatoprotective activity.[8, 9] Leaf, stem bark and root bark contain about 20 phenols, 7 flavonoids and 4 anthocyanidins.[10] Hence scientific evaluation of *in vitro* anthelmintic activity of stem bark and root bark of the selected plant is carried out to prove its herbal usage.

MATERIALS AND METHODS

Plant Material Collection and Identification

Plant material *Capparis sepiaria* L. **(Fig- I)** is collected from S. V. Agricultural College, and Kalyani dam near Tirupati during flowering period in the months of March – May and Taxonomic identity was confirmed by Prof. N.Yasodamma, voucher herbarium specimen CS1295 is deposited in the herbarium, Department of Botany, S.V.University, Tirupati as per the standard method.[11] Stem bark and Root bark materials were collected and dried under shade. The dried plant parts were ground well into a fine powder in a mixer grinder and sieved to particle size of 50 – 150mm and stored in polythene bags at room temperatures until used.

Fig – I: *Capparis sepiaria* L. Twig

Extracts preparation

Stem bark and Root bark of 40 g each were subjected to soxhlet extractions with Alcohol and Methanol. Filtrates were concentrated on rotavapour; the above obtained semisolid extracts were preserved in airtight bottles at 4ºC in the refrigerator until further use.

Worm collection

Earthworms *Pheretima posthuma* of approximately equal size were collected from Ram Mohan Organic Inputs, (Licence No: 4447/2006 issued by C&DA (A.P).Hyderabad) Brahmanakalva (Village), Pathi Puttur (Post) Ramachandrapuram (Mandel), Chittoor Dist., A.P.

Preparation of Desired Formulation of Plant Drug and *Albendazole* (Reference Drug)

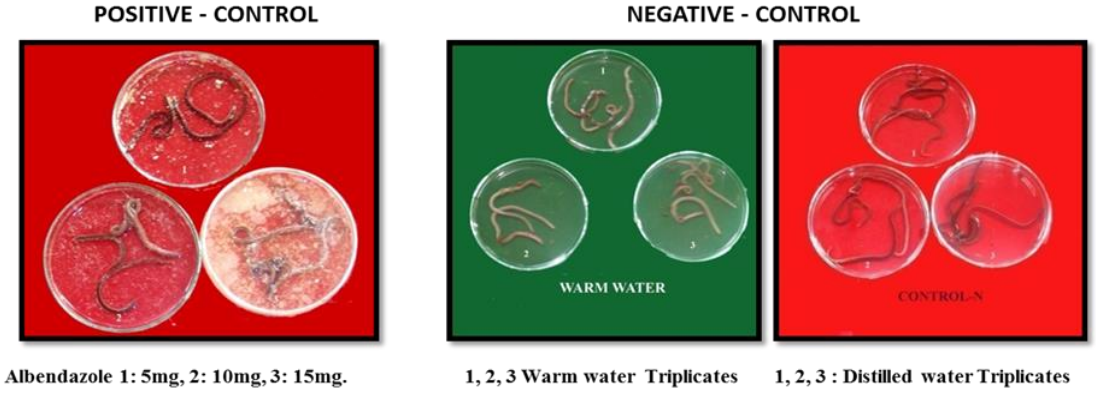
Each extract was prepared by dissolving 5, 10, 15mg of Stem bark and Root bark alcohol, methanol extracts and *Albendazole* extract each in 25 ml of distilled water.

Experimental procedure (Fig - II)

The anthelmintic assay was carried out as per the standard method Gosh.[12] *Albendazole* used as standard reference drug and distilled water as control. Worms were washed with normal saline to remove all faecal matter and earth worms of 8cm in length approximately and 0.5-0.8 cm in width were selected. Seventeen groups consisting three worms in each group were released into 25ml of desired formulation. Five groups were prepared as control distilled water, warm water, reference drug *Albendazole* of 5, 10,15mg and remaining as drug alcohol and methanol extracts each 5, 10, 15mg of Stem bark and Root bark extracts of *C. sepiaria* .

Observations were made for time taken for paralysis and death of individual worms. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death was concluded when the worms lost their motility followed with fading away of their body colour.

Fig – II: Stem bark Alcohol – I; Stem bark Methanol – II; Root bark Alcohol –III; Root bark Methanol – IV; 1= 5 mg ; 2= 10 mg; 3= 15 mg and Controls



RESULTS AND DISCUSSION: [Table-I, Fig- III]

The present study revealed that both the alcoholic and methanolic extracts at low concentration showed potent activity to that of the standard drug *Albendazole. C. sepiaria* root bark methanolic extract at 5mg conc. showed potent activity with 15.06 mints for paralysis and 19.6 mints for death, followed by root bark alcoholic extract at 5mg conc. with 18.9 mints for paralysis and 37.7mints for death, stem bark alcoholic extract at 5mg conc. with 30.76 mints for paralysis and 60.56 mints for death and stem bark methanolic extract at

5mg conc. with 34.93mints for paralysis and 69.7mints for death when compared with the standard drug at 5mg conc. with 90.9mints for paralysis and 110.1mints for death. Anthelmintic activity is observed in other species of Capparidaceae like *Capparis sepiaria* leaves[7], *Capparis spinosa* root bark[13], *Buchholzia coriaceae* and *Gynandropsis gynandra*[14], *Capparis zeylanica* roots[15], *Cleome hassleriana* seeds[16], *Cadaba fruticosa* and *C. trifoliate*[17], *Crateva unilocularis* leaves.[18] Presence of phytochemicals like saponins, tannins, terpenoids, phenolic and flavonoid compounds in the plant parts may be responsible to inhibit the worm infestation effectively due to the interaction of these compounds in a synergistical manner.

Table- I: Anthelmintic Activity

S.N	Extracts	Conc. in mg	Time Taken for Paralysis		Time Taken for Death	
			Stem Bark	Root Bark	Stem Bark	Root Bark
1	Alcohol	5	30.76±0.18	18.9±0.08	60.56±0.88	37.7±0.85
		10	25.93±0.44	14±0.16	55.43±0.69	23.33±0.84
		15	21.26±0.20	9.5±0.29	46.6±2.29	16.2±0.49
2	Methanol	5	34.93±0.44	15.03±0.12	69.7±0.86	19.6±0.43
		10	26.16±0.44	9.56±0.16	40.16±0.30	14±0.16
		15	14±0.08	3.93±0.54	26.13±0.49	10.5±0.32
3	Albendazole	5	90.9±0.84		110.1±0.12	
		10	62.1±0.12		71.2±0.16	
		15	34.4±0.21		41.0±0.43	
4	Distilled Water	15ml	-		-	

All the Values are represented in Mean ± S.D; n=3 in each group.

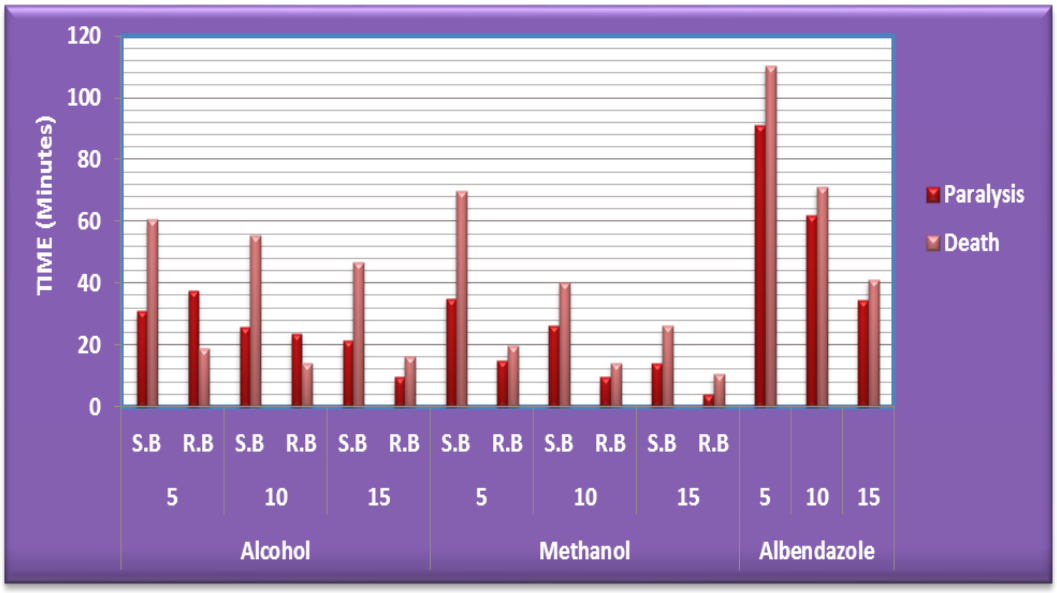


Fig -III: Graph showing Anthelmintic activity

CONCLUSION

Hence it is concluded that *C. sepiaria* an Ayurvedic medicinal plant possess anthelmintic property. Stem bark and root bark alcoholic and methanolic extracts which is widely used to treat various ailments and diseases have promising *in vitro* anthelmintic activity against *P. posthuma* at a very low concentration of 5 mg than the standard drug. Thus further research for standardization of the drug is very much essential for isolation of bioactive anthelmintic compounds.

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