

Evaluation of *Cyathodium cavernarum* Kunze Aqueous Extract for Anthelmintic Activity

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ABSTRACT

Bryophytes are a common sight in and around the world. Being small and relatively common, bryophytes are often overlooked and understated. The present study aims at exploring one such kind - *Cyathodium cavernarum* Kunze for its anthelmintic property. Anthelmintic activity of *Cyathodium cavernarum* aqueous extract was evaluated using Indian earthworms *Pheretima posthuma* at 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml and 50mg/ml, using piperazine citrate as standard. The time taken for paralysis and death was calculated for both the groups. *Cyathodium cavernarum* aqueous extract exhibited poor anthelmintic activity as compared to the standard drug. The study clearly indicates *Cyathodium cavernarum* aqueous extract is not a suitable drug of choice for anthelmintic properties.

Key Words: Bryophytes, *Cyathodium cavernarum*, *Pheretima posthuma* and anthelmintic

INTRODUCTION

Bryophytes are the simplest non-vascular land plants with undifferentiated plant. They are more advanced than aquatic algae. They are generally believed to have evolved from algae. They are commonly called as "non vascular plants" because they do not have true vascular tissue and are therefore called "non-vascular plants".¹ They usually grows on tree bases, trunks, branches, twigs, or leaves, or on fallen logs as dense patches usually in a undisturbed forest.² *Cyathodium cavernarum* Kunze (Cyathodiaceae) is a tiny bryophyte, whose thallus are usually found in yellowish-green to light greenish or fluorescent green, thin, delicate, 4-10 x 4-5 mm in size, often dichotomously branched.³

As per World Health Organization(WHO) estimates there are about 2 billion people harbor of parasitic worm infections. These parasitic worm also infect livestock and crops. According to the WHO, only a few drugs are used in treatment of helminthes in humans. Anthelmintic drug from herbal sources will play an important role for these kinds of parasitic infections.⁴ In the current study, an attempt has been made to evaluate the anthelmintic potential of the commonly available bryophyte of Malabar region(Kerala) *Cyathodium cavernarum* Kunze.

MATERIALS AND METHODS

Plant Material Collection: *Cyathodium cavernarum* Kunze bryophytes were collected from the Malabar region of Kerala and the same was authenticated by Mrs. Manju.K.Nair, Asst. Proffessor, Guruvayoorappan college of Arts and Science, Calicut during the month of July 2013. Preparation of extract: The collected plant materials were made completely free of soil by thorough washings and it

is dried. The dried materials were extracted using water using cold maceration technique and it is dissolved in water prior to the use of study.

Animals: *Pheretima posthuma*(Indian Earthworms) resembles in anatomical and physiological aspects as that of human intestinal roundworm parasite.⁵⁻⁷ The healthy adult earthworms were collected from soil, washed and sorted out based on their size and length and used for the study.

Anthelmintic studies: Earthworms of uniform size and length ranging between 3-5cm in length and 0.1-2cm width were selected for the study. 11 groups of 6 earthworms each were released into 10ml of desired solutions. Group I, serves as a negative control and contain normal saline. Group II to VI were treated with *Cyathodium cavernarum* aqueous extract of 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml and 50mg/ml respectively. Group VII to XI were treated with piperazine citrate of 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml and 50mg/ml respectively. The earthworms were kept under observation for the time taken by them to paralyze and the death of the individual worm up to 4hrs of test period. Paralysis of the worms were confirmed when they did not revive in normal saline and death was concluded by losing up of their motility followed by fading away of their body colours.^{8&9} Statistical Analysis: Statistical analysis was performed by one way ANOVA and the results were expressed as mean± S.E.M for 6 earthworms in each group. P<0.05 was considered as significant.

RESULTS AND DISCUSSIONS

Table 1: Anthelmintic activity of *Cyathodium cavernarum* Kunze and Piperazine citrate

Group	Treatment	Dose	Time taken for Paralysis in min	Time taken for Death in min
I	Control	-	-	-
II	<i>Cyathodium cavernarum</i> aqueous extract	10mg/ml	>240min	>240min
III		20mg/ml	>240min	>240min
IV		30mg/ml	>240min	>240min
V		40mg/ml	194.6 ±0.9274 ^{ns}	223.4 ±0.8124 ^{ns}
VI		50mg/ml	190.0 ±0.7071 ^{ns}	199.4 ±0.5099 ^{ns}
VII		Piperazine citrate	10mg/ml	85.6 ±0.5099
VIII	20mg/ml		32.4 ±0.5099	047.4 ±0.4000
IX	30mg/ml		16.4 ±0.5085	026.6 ±0.7483
X	40mg/ml		10.1 ±0.7071	020.4 ±0.5099
XI	50mg/ml		05.6 ±0.2449	008.2 ±0.3742

All the values are expressed in mean ±SEM and compared to piperazine citrate group. ns=Non significant, n=6

Helminthiasis is a common condition prevailing in most part of the world due to worm infestation. This condition mostly prevails due to the lack of adequate sanitary facilities and supply of pure water associated with poverty and illiteracy.¹⁰ Helminthiasis is prevalent globally in 1/3 of population but most common in a developing country like India. In India, helminthiasis is a common problem largely seen in rural areas and to some extent in urban regions also. Anthelmintics are the drugs which expel the parasitic worms (helminths) from the body by either stunning or killing them. But the major drawback associated with this anthelmintic is that, most of the gastrointestinal helminthes are become resistant to the currently available drugs.¹¹ Moreover, these drugs are also at high cost.¹² These factors contributed the way for trying out novel anthelmintic agent from herbal resources. Bryophytes are a common sight in and around the world. Being small and relatively common bryophytes are often over looked and understated. In the present study an attempt had been made to evaluate anthelmintic potential of *Cyathodium cavernarum*. Preliminary phytochemical studies on *Cyathodium cavernarum* revealed that the drug contains trace levels of carbohydrates, flavonoids and proteins. Aqueous extract of *Cyathodium cavernarum* was evaluated for its anthelmintic property using Indian earthworm *Pheretima posthuma* at 5 different concentrations 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml and 50mg/ml against the standard drug piperazine citrate at the same doses of treatment. The study clearly depicts that the bryophyte- *Cyathodium cavernarum* is not a suitable drug of choice for the anthelmintic action.

CONCLUSION

Bryophytes are a common sight in and around the world. In the present study an attempt had been made to evaluate anthelmintic potential of *Cyathodium cavernarum* aqueous extract at 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml and 50mg/ml against the standard drug piperazine citrate. The study concludes that the bryophyte- *Cyathodium cavernarum* Kunze aqueous extract is not a suitable drug of choice for the anthelmintic action.

REFERENCES

1. Bryophyte. <http://en.wikipedia.org/wiki/Bryophyte> DOB:20/8/2013.
2. Thomas Hallingback and Nick Hodgetts. Status Survey and Conservation Action Plan for Bryophytes. Mosses, Liverworts and Hornworts. IUCN Publications Services Unit, UK. 2000, 14.
3. Nair MC, Rajesh KP and Madhusoodanan PV. Bryophytes of Wayanad in Western Ghats. Malabar Natural History Society, Kozhikode. 2005, 284.
4. Ashok Kumar BS, Lakshman K, Jayaveera KN, Nandeesh R, Manoj B and Ranganayakulu D. Comparative *in vitro* anthelmintic activity of three plants from the amaranthaceae family. Arch. Biol. Sci., Belgrade, 2010; 62 (1): 185-189.
5. Vidyarthi RD. A Textbook of Zoology. 14th Edn. New Delhi: Chandand Co. Press, 1977, 329-31.
6. Thorn GW., Adams RD., Braunwald E., Isselbacher KJ and Peterdrof RG. Harrison's Principles of Internal Medicine. 8th Edn, New York, Mc Grew Hill, 1977, 1088-90.
7. Vigar Z. Atlas of Medical Parasitology. 2nd Edn. Singapore: Publishing House, 1984. 216-18.
8. Singh S., Rai AK, Sharma P., Barshiliya Y. Comparative study of Anthelmintic activity between aqueous extract of *Areva Lanata* and *Rotula aquatica* Lour. Asian Journal of Pharmacy and Life Science. 2011;1 (3): 211-215.
9. Dash GK, Suresh P, Sahu SK, Kar DM, Ganapathy S and Panda A. Evaluation of *Evolvulus alsinoides* Linn. for anthelmintic and antimicrobial activities. Journal Natural Remedies 2002; 2: 182-85.
10. Walter PJ, Richard KK. Chemotherapy of parasitic infections, In; W.C. Campbell and L.S. Rew (eds), plenum, New York, 1985, 278-539.
11. Temjenmongla and Yadav A. Anticystodal efficacy of folklore plants of Naga tribes in North East India, Afr. J. Trad. Cam. 2005; 2(2): 129-133.
12. Nisha PV., Shruti N., Sweta Swamy K., Meera Kumari, Vedamurthy AB., Krishna V and Joy H. Hoskeri. Anthelmintic activity of *Pyrostegia venusta* using *Pheretima posthuma*. International Journal of pharmaceutical sciences and drug research. 2012, 4(3):205-208.