Innovare Academic Sciences

International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 6, Issue 7, 2014

Original Article

IN VITRO ANTHELMINTIC ACTIVITY OF AQUEOUS AND METHANOLIC EXTRACTS OF *OLDENLANDIA UMBELLATA*

SOMNATH D. E.[1]*, AKALANKA DEY[2], A. M. S. SUDHAKAR BABU[3], SIDDABATHUNI ANEELA[1]

[1] Dr. Samuel George Institute of Pharmaceutical Sciences, Markapur- 523316, Andhra Pradesh, [2]Annamalai University, Department of Pharmacy, Annamalai Nagar 600802, Tamil Nadu, India, [3]A.M.Reddy Memorial Colleges of Pharmacy, Narasaraopet, Guntur 522601, AndhraPradesh

Email: somnath.bankura@gmail.com

Received: 12 June 2014 Revised and Accepted: 14 Jul 2014

ABSTRACT

Objective: The present study was carried out to evaluate the in vitro anthelmintic activity of aqueous and methanolic extracts of *Oldenlandia umbelata* against *Pheretima posthuma*.

Methods: Three different concentrations, each of crude alcoholic and aqueous extract (10, 50,100 mg/ml in distilled water) were prepared and six worms (same type) were placed in it. Observations were made for the time taken to cause paralysis and death of the individual worms. Mean time for the paralysis (P) in min was noted when no movement of any sort could be observed,except when the worm was shaken vigorously; time of death (D) in min was recorded after ascertaining the worms neither moved when shaken vigorously nor when dipped in warm water (50°C). Piperazine citrate (10mg/ml) was included as reference compounds.

Results: The extracts of *Oldenlandia umbelata* not only demonstrated paralysis, but also caused death of worms, especially at higher concentration of 100 mg/ml in shorter time as compared to reference drug Piperazine citrate.

Conclusion: In present statement methanolic and aqueous extracts of plant of *Oldenlandia umbelata was* investigated for their anthelmintic activity against *Pheretima posthuma.* Various concentrations were used in the bioassay, which involved paralysis and death time of the worms. Both the extracts showed significant anthelmintic activity.

Keywords: Anthelmintic activity, *Pheretima posthuma, Oldenlandia umbelata,* Aqueous extract, Methanol extract.

INTRODUCTION

The use of medicinal plants as a source for relief from illness can be traced back over five millennia to written documents of the early civilization in China, India and the near east but it is doubtless an art as old as mankind[1]. Plants have beneficial activity in different type of diseases producing in human beings. As per WHO calculate that about 80% of the world's inhabitants problem should treated by medicinal herbal drug for their primary health care [2-3]. With the advancement in Science and Technology, remarkable progress has been made in the field of medicine with the discoveries of many natural and synthetic drugs [4]. *Oldenlandia Umbellata* is known as *Hedyotis umbellata.* This genus comprises of herbs and shrubs distributed in the tropical and sub-tropical regions of world. About seventy species occur in India, some of which are used in medicine. The plant *Oldenlandia Umbellata* belongs to the family Rubiaceae [5]. The leaves and roots are considered expectorant and used in asthma of bronchitis [6]. The root powder has been subjected to clinical trials and it has been proved to be an efficacious remedy for blood particularly in the conditions of Tuberculosis [7]. It is a low growing plant native to India and commonly found in parts of India (Coromandel coast), Burma, Sri Lanka, Cambodia and Indonesia. The plant is well-known in Siddha Medicine for its styptic property. It is also a drug that can be administered for bronchial asthma, as a decoction of the entire plant, a decoction made from its root and liquorice in the ratio 10:4 or the powdered root is given either with water or honey. Both leaves and roots are also deemed good expectorants, and used for treatment of asthma, bronchitis, and bronchial catarrh [8]. In folklore medicine this plant is widely used in the treatment of various ailments. The decoction of the plant is widely used as an expectorant and febrifuge. It is also used in treatment of cancer, asthama and tuberculosis [9-10].These varied uses have increased utilization and exploitation of *O. umbellata* for medicinal and dye extraction purposes [11]. As a result, natural stands of *O. umbellata* are fast disappearing and are threatened with extinction due to indiscriminate collection.

The plant grows wild in forests, among other areas, and there is no propagation system available to replenish these stands. The present study was done with the aim to investigate the anthelmintic activity of *Oldenlandia Umbellata.* In this experiment, we performed the In-vitro study of anthelmintic activity of natural drugs and compared with the standard drugs Piperazine citrate.

MATERIALS AND METHODS

Collection of the plant material

The plant *Oldenlandia umbellata* was collected from Thothukudi distric (Tamil Nadu), India, during the months of October and November 2011 and all the primary work done (washing, drying…etc.).The plant materials was identified and authenticated by Dr. V. Chelladurai, Retired Research officer-botany, Central Council for Research in Ayurveda and Sidha (C.C.R.A.S). Govt.of India, Tiruneveli. The collected plant material was free form disease and also free from contamination of other plants.

Preparation of plant extract

100g of *O. umbellata* air dried and coarsely powdered entire plant material was extracted with 500ml methanolic solvent by using a soxhlet extractor. After extraction the sample was kept in dark for 72 hrs with intermittent shaking. The solvent was decanted and distilled off in Rotovoc apparatus. The methanol extract was completely dried from solvent under reduce pressure using high vaccum conditions. The collected extract was then taken up for further investigations.

Selection of worms

Indian adult earthworms (Pheretima Posthuma) collected from moist soil and washed with normal saline to remove all fecal matter were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocols.

Evaluation of Anthelmintic activity

The anthelmintic assay was carried as per method of Ajaiyeoba et al [12] with minor modifications. The anthelmintic activity was evaluated on adult Indian earthworm Pheretima Posthuma worm due to its anatomical and physiological resemblance with the intestinal round worm parasites of human beings. Three different concentrations, each of crude alcoholic and aqueous extract (10, 50,100 mg/ml in distilled water) were prepared and six worms (same type) were placed in it. This was done for both types of worms. The observation was made for the time taken to cause paralysis and death of the individual worms. Mean time for the paralysis (P) in min was noted when no movement of any sort could be observed,except when the worm was shaken vigorously; time of death (D) in min was recorded after ascertaining the worms neither moved when shaken vigorously nor when dipped in warm water (50°C). Piperazine citrate (10mg/ml) was included as reference compound [13-14].

RESULTS AND DISCUSSION

As shown in Table-1, methanolic and aqueous extract exhibited anthelmintic activity in a dose dependent manner, giving shortest time of paralysis (P) and death (D) with 100 mg/ml concentration. The alcoholic extract of *Oldenlandia umbelata* caused paralysis of 8.66 min. and time of death of 28.50min. while aqueous revealed paralysis of 8.66 and 33.33 min. Respectively against the earthworm *Pheretima Posthuma*. The reference drug *Piperazine citrate* showed the same at 15.17 and 41.67 minutes, respectively. Piperazine citrate by increasing chloride ion conductance of worm muscle membrane produces hyper polarization and reduced excitability that leads to muscle relaxation and flaccid paralysis. The extracts of *Oldenlandia umbelata* not only demonstrated paralysis, but also caused death of worms especially at higher concentration of 100 mg/ml in shorter time as compared to reference drug Piperazine citrate. Phytochemical screening of the extracts revealed the presence of alkaloids, saponins, flavonoids, triterpenes, tannins and steroids [15]. Tannins were shown to produce anthelmintic activities chemically tannins are polyphenolic compounds. It is possible that tannins contained in the extracts of Oldenlandia umbelata produced similar effects. Reported anthelmintic effect of tannins is that they can bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and may cause death. Further studies are in process to identify the possible phytoconstituents responsible for anthelmintic activity.

Table 1: Anthelmintic activity of methanolic and aqueous extracts of plant of *oldenlandia umbellata*

Test Subs	Concentration (µg/ml)	Time taken for Paralysis (P) and Death (D) of worms in mins.	
		Paralysis	Death
Control	-	-	-
MEOU	10	27.5 ± 0.56	66.00 ± 0.36
	50	16.00 ± 0.56	44.50 ± 0.42
	100	08.66 ± 0.49	28.50 ± 0.42
AEOU	10	26.17 ± 0.47	65.83 ± 0.60
	50	19.67 ± 0.71	50.67 ± 0.55
	100	08.66 ± 0.33	33.33 ± 0.66
Piperazine citrate	10	15.17 ± 0.47	41.67 ± 0.76

Results are expressed as mean ± SEM from six observations

CONCLUSION

The anthelmintic activities of methanolic extract of *Oldenlandia umbellata* have been tested against the worms Pheritima Posthuma. It has been seen in Table no. 1 that the extract required higher concentration as compared to Pperazine citrate as standard drugs for anthelmintic activity. Finally, it concludes that the concentration of *Oldenlandia umbellata* has significant anthelmintic activities for the study can be continued for *In-vivo* evaluation for some species other than *Pheritima Posthuma* followed by isolating and characterizing of particular chemical moiety for the activity.

ACKNOWLEDGEMENTS

The authors are grateful to the Management of Dr.S.G.I.P.S, Markapur for providing necessary facilities to carry out the work and also gratifying to the Principal and Staff, Dr.S.G.I.P.S for their assistance with the study.

REFERENCES

1. Thomson WAR. Medicines from the Earth1978.
2. World D, Series WHO. WHO, Diet, Nutrition and the prevention of Chronic Organization Technical Report Geneva. J Biochemistry 2003;916.
3. Etkin NL. A Hausa herbal pharmacopoeia:biomedical evaluation of commonly used plant medicines. J Ethnopharmacol 1981;4(1):75-98.
4. Preethi R, Devanathan VV, Loganathan M. Antimicrobial and Antioxidant Efficacy of Some Medicinal Plants against Food Borne Pathogens. J Adv In bio Res 2010;4(2):122-5.
5. Csir. J Wealth of India 1959;5.
6. Kirtikar KR, Basu BD. J Indian Medicinal Plants 1935.
7. Purushothaman KK, Sarada K, Narayanasami V. Imbural (Oldenlandia umbellata). J Res Indian Med Biochemistry 1972;7(3).
8. Gupta M, Mazumder UK, Thamilselvan V, Manikandan L, Senthilkumar GP, Suresh R, *et al*. Potential hepatoprotective effect and antioxidant role of methanol extract of Oldenlandia umbellata in carbon tetrachloride induced hepatotoxicity in Wistar rats. J Pharmacol Ther 2007;6:5-9.
9. Nadkarni, K. D. J Indian Materia Medica:Popular Prakashan, Bombay, India, 1979.p. 869.
10. Kirtikar, K. R and Basu, B. D. J Indian Medicinal Plants Bishen:mahendra pal singh, Dehradun, India, 1975. p. 842-44.
11. Cardon, D. du Chatenet, G. 1990. Guide des teintures naturelles.Delachaux et NiestleS.A, Paris.
12. Adejimi JO, Harrison LJS. Parasitic Nematodes of Domestic Ruminants in Nigeria;Impact on Ruminant Production and Control. Trop Vet 15.1997:137-48.
13. Y. M. Shivkar, V. L. Kumar.;Anthelmintic activity of latex of Calotropis procera. J Pharm Biol 2003;41:263-65.
14. Mali JC, Hundiwale RS, Sonawane RN. R. G. Patil and B. C Hatapakki Evaluation of Capparis decidua for anthelmintic and antimicrobial activities. Ind J Nat Prod 20.2004:10-3.
15. Siddabathuni D. Somnath Akalanka Dey, and A. MS Sudhakar Babu GCMS analysis of phytocomponents in the methanolic extract of Oldenlandia umbellata. Int J of Chemical and Pharm Sci Dec 2013;4(4):7-10.