WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 7, Issue 18, 1061-1067. Research Article ISSN 2277–7105

COMPARATIVE STUDY OF ANTHEHELMINTIC ACTIVITY OF METHANOLIC AND AQUEOUS EXTRACT OF LEAVES OF RICINUS COMMUNIS LINN

P. Prapulla*

Mother Teresa College of Pharmacy, N.F.C Nagar, Ghatkesar, and Pin: 501301 Dist. Medchel, Telangana, India.

Article Received on
02 Sept. 2018,

Revised on 24 Sept. 2018,
Accepted on 15 October 2018

DOI: 10.20959/wjpr201818-13576

***Corresponding Author**
P. Prapulla
Mother Teresa College of Pharmacy, N.F.C Nagar, Ghatkesar, and Pin: 501301 Dist: Medchel, Telangana, India.

ABSTRACT

The main objective of the present study is an attempt to explore the anthehelmintic activity of crude methanolic and aqueous extract of leaves of *Ricinus communis* Linn in a comparative study using adult Indian earth worm *Pheretima posthuma* as test worm. Various concentrations of (25, 50, 100 mg/ml) of methanolic and aqueous extract s were tested in the bioassay, which involved the determination of time of paralysis (P) and time of death (D) of the worms. Albendazole was included as standard reference and distilled water as control. The results of present research work was observed that the methanolic extract of *Ricinus communis* Linn leaves is more potent activity (time of paralysis was found to be 06.00 ± 0.47 min, and time of complete death of worm was found to be 13.58 ± 0.77 min) than the aqueous extract (time of paralysis was found to be 16.08 ± 0.28 min, and time of complete death of worm was found to be 72.00 ± 0.26 min) and their activity was comparable with the standard drug Albendazole at the concentration of 100 mg/ml. In conclusion, the traditional use of leaves of the plant of *Ricinus communis* Linn as an helmintholytic activity have been confirmed and further studies are suggested to isolate the active principles responsible for activity.

KEYWORDS: Albendazole, Antihelmentic, *Ricinus communis* Linn, *Pheretima posthuma*.

INTRODUCTION

The world population use herbal medicine for health care because of safety, efficacy, easily and abundantly available without side effects. The conditions appear to be worsening with respect to the number of persons affected. Helminthiasis infections are particularly in patients

residing in tribal areas lack of knowledge of sanitation and illiteracy's. Plant *Ricinus communis* Linn belongs to the spurge family, Euphorbiaceae and it is popularly known as castor oil leaves used for the treatment of and helminthiasis.[1] The present study was aimed to evaluate the scientific basic for the traditional use of antihelmentic activity of crude methanolic and aqueous leaves extract of *Ricinus communis* Linn against *Pheretima posthuma*. Albendazole was included as standard reference and distilled water as control. Scientific literature survey revealed that the *in vitro* antihelmentic activity of *Ricinus communis* Linn has not been reported.

Causative Agents: Antihelminthitic drugs are used in the treatment of helminthiasis (vomiting of worms). The different types of worms include.

i) Round worms: They are of two types, Adult Intestinal Nematodes and Larval Tissue Nematodes.

ii) Tape worms: They are found in the intestine or larva in the tissues.

iii) Flukes: These are hermaphrodites with an exception of blood flukes. They are found in blood vessels, the intestine, billiary tract, lungs.

Symptoms

Symptoms of Helminthiasis are as follows

1) Abdominal pain.
2) Diarrhea.
3) Fever.
4) Fatigue.
5) Enlarged liver.
6) Gastrointestinal inflammation.
7) Eosinophilia.
8) Dehydration.

Mode of Transmission

The disease is transmitted through

1) Fecal - oral route for ascaris, trichuris and hookworm.
2) Skin penetration for hookworms.

Prevention and Control

Following measures can be taken for prevention and control of the disease

- Personal hygiene.
- Environmental sanitation.
- Clean food and drinking water.
- Use of slippers or shoes
- The drugs used are Albendazole, Mebendazole and Levamizole.[2]

Description of plant

Ricinus communis Linn, the castor bean or castor oil plant, is a species of perennial flowering plant in the spurge family, Euphorbiaceae. The glossy leaves are 15–45 cm (5.9–17.7 in) long, long-stalked, alternate and palmate with five to twelve deep lobes with coarsely toothed segments. In some varieties they start off dark reddish purple or bronze when young, gradually changing to a dark green, sometimes with a reddish tinge, as they mature.

Characteristics of *Ricinus communis* Linn

Figure. 1: Diagram of *Ricinus communis* Linn plant.

Traditional and other medicinal uses

The leaves are useful in "vata" and "kapha", intestinal worms, night blindness, ear ache; increases biliousness. Leaves are useful in burns, nyctalopia, strangury and for bathing and fermentation and vitiated conditions of vata, especially in rheumatoid arthritis and arthralgia. Fresh leaves are used by nursing mothers in the Canary Island as an external application to increase the flow of milk.[3]

Phytochemistry: Per 100 g, the leaves are reported to contain on a zero - moisture basis, 2, 670 mg calcium, and 460 mg phosphorous. The leaves contain isoquercetin 2, 5 -dihydroxy benzoic acid and epicatechin. They contain rutin, hyperoside, quercetin, chlorogenic acid, neochlorogenic acid and gallic acid. They contain an invertase, a glycoprotein activated by macromolecules including proteins and lectins from castor.[4]

MATERIALS AND METHODS

Collection of plant: *Ricinus communis* Linn (Leaves) were collected from Vangapally, Yadagirigutta and were identified by Prof. Dr. S. Srinivas Rao.

Preparation of plant extract: Powdered dried Leaves (100 g) were extracted with 250 mL methanol and water using a Soxhalet apparatus. Then plant material was powdered finely and the net weight of the powdered plant material was (1.2 kg).[5] The methanol extract was carried out by soxhlation for 72 hrs & aqueous extraction was carried out by maceration method for 7 days. Then the methanol soluble materials were filtered off using whatman filter paper No.1. Filtrate were intermingled and decoctured under vacuum at 40^{o} C using rotary evaporator. The yield was 3 g per 100 g of *Ricinus communis* Linn *leaves*. The *Ricinus communis* Linn extract was then subjected to characterization and phytochemical screening.[6]

Collection of worm and authentication: Indian earthworm *Pheretima posthuma* (annelida) were collected from the water logged areas of soil and authentified Prof. Dr. T. Ramesh.

Helmintholytic activity

- The activity was performed on Indian earth worms due to its anatomical and physiological resemblance with the intestinal round worm parasite of human intestine.
- Indian adult earth worm (*Pheretima posthuma*) of 5-8 cm in length and 0.2-0.3 cm in width were used.[7]
- Eight groups of approximately equal sized earth worms each containing six earth worms were selected.[8]
- All the earth worms were washed in normal saline solution before they were used.
- The control group was treated with distilled water.
- The earth worms were placed in a standard and extracts and time of paralysis (P) and time of death (D) were calculated.[9]
- The time of paralysis was noted when no movement of any sort could be observed expect when the worms were shaken vigorously.[10]

• The time of death were recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water (50^0 C).[11]

RESULTS AND DISCUSSION

Results of the preliminary phytochemical screenings of crude alcoholic extract detect tannins, alkaloids, Phenol compounds, amino acids and carbohydrates. Some of the traditionally used herbs have scientifically proved a mark and potent antihelmentic activity by using suitable experimental models. Both methanolic and aqueous extract of Leaves of the plant *Ricinus communis* Linn exhibited antihelmentic activity in dose-dependent manner giving shortest time of paralysis (P) and death (D) with 100 mg/ml concentration. Similar effects were observed for the tested standard drug (Albendazole) by using adult Indian earth worm, *Pheretima posthuma*. The results of present research work was observed that the methanolic extract of *Ricinus communis* Linn leaves is more potent activity (time of paralysis was found to be 06.00 ± 0.47 min, and time of complete death of worm was found to be 13.58 ± 0.77 min) than the aqueous extract (time of paralysis was found to be 16.08 ± 0.28 min, and time of complete death of worm was found to be 72.00 ± 0.26 min) and their activity was comparable with the standard drug Albendazole at the concentration of 100 mg/ml.

Table. 1: Antihelmentic activity of methanolic and aqueous extract of leaves of *Ricinus communis* Linn.

Test substance	Concentration (mg/ml)	Time taken for paralysis (P) Death (D) of earth worms (min)	
		P	D
Albendazole	25	25.5 ± 0.78	32.10 ± 0.57
	50	18.6 ± 0.65	20.04 ± 0.42
	100	10.0 ± 0.32	16.38 ± 0.29
Methanolic extract	25	22.00 ± 0.26	34.26 ± 0.23
	50	14.00 ± 0.50	28.84 ± 0.94
	100	06.00 ± 0.47	13.58 ± 0.77
Aqueous extract	25	39.62 ± 0.68	85.31 ± 0.83
	50	21.55 ± 0.33	80.24 ± 0.75
	100	16.08 ± 0.28	72.00 ± 0.26
Control	-	-	-

Values are mean ± S.E.M. from six observations. ***P****: Time for Paralysis (min),* ***D****: Time for Death of worms (min)* Control worms were alive for up to 24 hrs of the experimentation.

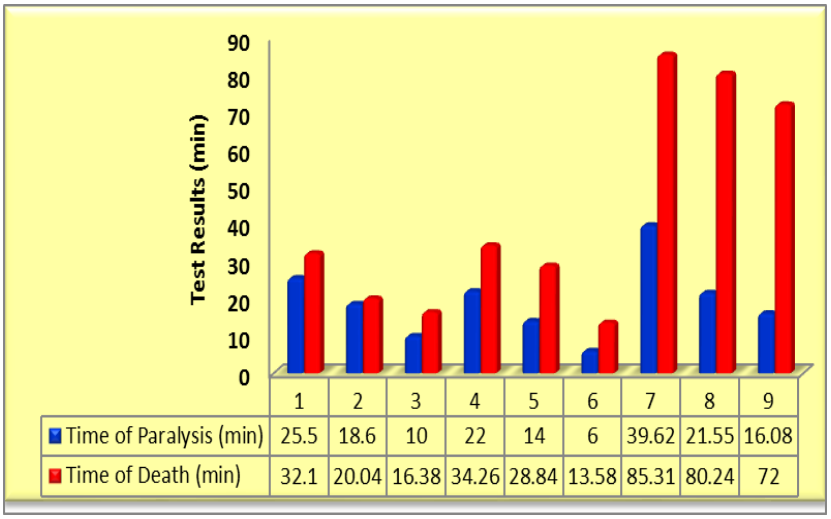

Figure. 2: Diagrammatic presentation of Antihelmentic activity of leaves of *Ricinus communis* Linn in different concentrations (1, 2, 3: Albendazole at 25, 50, 100 mg/ml, 4, 5, 6: methanolic extract at 25, 50, 100 mg/ml, 7, 8, 9: aqueous extract at 25, 50, 100 mg/ml respectively)

CONCLUSION

From the above result it is concluded that methanolic extract of leaves of *Ricinus communis* Linn have a potent antihelmentic activity when compared with con-emotionally used drug. It is comparable with standard drug. Further studies using *in vivo* model are required to find out and to establish effectiveness and pharmacological rationale for the use of leaves as antihelmentic drug. Further studies to isolate active constituent from extracts and to establish (s) mechanism of action is required.

ACKNOWLEDGEMENT

I am very thankful to Mr. L. Matsyagiri, Associate Professor, Swami Vivekananda Institute of Pharmaceutical Sciences, Vangapally, Yadagirigutta, Yadadri Bhongir-506286, Telangana, India, for his support for the study.

REFERENCES

1. The Ayurvedic pharmacopeia of India, Government of India Ministry of Health and Family Welfare Department of Ism & H., 2001; 1(3): 49-50.
2. Matsyagiri Lenkalapally, Sumathi Cheruku, Shrvya Koppula, Sindhuja Sandhi, Narayana Mandapu, and Gowri Shankar NL Helmintholytic Activity of the Methanolic and Aqueous Extract of Seeds of Cleome viscose, Res. J. Pharmacol and Pharmacody, 2012; 4(5): 259-62.

3. Kirtikar and Basu, Indian medicinal plants. IInd edition, 1991; 3: 2272-2275.
4. Shokeen P, Anand P. Krishna M. and Tando V, Antidiabetic activity of 50% ethanolic extract of Ricinus communis and its purified fractions. Food and chemical Toxicology, 2008; 46(11): 3458-3466.
5. Ladda P L., Magdum CS, Evaluation of anti-tubercular activity of Ricinus communis Linn. By proportion, nra and bact/alert methods Int. J. Pharm. and Pharma. Sci., 2012; 4(3): 474-478.
6. Banerjee S, Mukherjee A, Bandyqpadhyay SK, Mukherjee PK and Sikdar S, Preliminary ‘studies on the anti-inflammatory effects of Ricinus communis, Indian Journal of pharmacology, 1990; 22: 239-244.
7. Prapulla Putta, Helmintholytic activity of leaves of fenugreek plant (Trigonella Foenum-Graecum), World J. Pharma. Resea, 2018; 7(12): 828-835.
8. Matsyagiri. L, Prapulla. P, Dr Hemamalini. K, Investigation of in vitro anthelminthic activity of bark of Emblica offisnalis, Indo Ame. J. Pharma. Resea, 2018; 8(08): 1480-1484.
9. Antihelmentic activity of methanolic leaf extracts of Sophora interrupta Hemamalini. K, Rajani. A, uma vasireddy and Ratna sundari E. Int. Res. J. Pharm, 2013; 4(8): 148-150.
10. Hemamalini.K, Naik.OPK, Peddi.A and Soma. S. In vitro antihelmentic activity of Anogeissus latifolia extract against Pheritima posthuma. J. Global Pharma Tech, 2011; 3(3): 21-4.
11. Uma vasireddy, Hemamalini. K, Vamshi G, K.Harinath, Vishnuvardhan. E, Nagarjun Goud, A.Raghu.H and Sharth Goud. T. In vitro anthelmintic activity of Solanam pubescens and Gymnosporia emerginata leaves. Int. J. of Pharma and Biosceinces, 2011; 2(3): 406-10.