RESEARCH ARTICLE

JPAR 2022

Journal of Pharmaceutical Advanced Research

(An International Multidisciplinary Peer Review Open Access monthly Journal)

Available online at: www.jparonline.com

Phytochemical investigation and *in-vitro* Anthelmintic activity of root of *Caesalpinia crista*

Pavankumar M*, Vijay Kumar MMJ, Basavaraja HS, Vinay R,Vikas R Mathad, Akkamma HG, Pavitra hedge, Prajwal J

SJM College of Pharmacy, Chitradurga, Karnataka - 577502, India.

Received: 18.11.2022 Revised: 07.12.2022 Accepted: 12.12.2022 Published: 31.12.2022

ABSTRACT: Background: In recent trends use of herbal drugs has gained the most importance in treating various diseases. It is impossible to imagine the survival of the human race if the Earth had no plants on it. **Aim:** To study the anthelmintic activity of the root *Caesalpinia crista.* The anthelmintic activity of the ethanolic extract of *C. crista* was significantly compared with the standard drug (Albendazole). Many synthesized drugs are available in the market. We performed anthelmintic activity using crude extract of *C. crista due* to its low toxicity level. **Method:** The ethanolic extract of roots of *C. crista* was evaluated for Phytochemical screening. *In-vitro* anthelmintic activity of the root *C. crista* was studied by using earthworm as a model against Albendazole as a standard drug. The testing drug dose was 0.1, 02, and 0.5 % m/v respectively. **Results:** The preliminary phytochemical studies revealed the presence of Alkaloids, Flavanoids, Triterpenoids, and Tannins from the ethanolic extract of the root of *C. crista.* Alcoholic extract of root *Caesalpinia crista* shows significant anthelmintic activity. The activity shown by the plant extract was well comparable with the standard drug. The anthelmintic activity showed by *C. crista* in a dose-dependent manner. **Conclusion**: From the above**,** it can be concluded that *C. crista* shows anthelmintic activity such that a medicinal plant can be used as folk medicine. This will boost the scientific communities to continue more research work.

Corresponding author:
Mr. Pavankumar M
PG Scholar
SJM College of Pharmacy,
Chitradurga, Karnataka - 577502, India.
Tel: +91-8050659530
E. Mail ID: pavankumarm14816@gmail.com

Keywords: *Caesalpinia crista,* Albendazole, *In-vitro,* Anthelmintic, Earthworm.

INTRODUCTION:

Plants are very useful to mankind, and many plants are exclusively used by humans for medical functions to treat illnesses. In current years, herbal merchandise such as medicinal vegetation has gained the most important interest in the pharmaceutical research area. Medicinal plant life is the richest and most common to be had resource for drug discovery [1].

Many pharmaceutical lead molecules are derived from a natural plant source. The fee of the remedy, period of illness, and destructive impact/ toxicity of allopathic pills purpose and boom within the use of opportunity

structures of drugs, which lead to the drastic development of the herbal drugs industry. The estimated market for pharma and pharma merchandise in 2022 will be $1.12 trillion and this suggests the global pharma needs. This could be due to adjustments in way of life and elevated risk of contamination globally. The world fitness organization recommends the exercise of the traditional machine of medicine as its miles affordable, secure, and culturally appropriate. The goal of this assessment article is to summarize the importance of vegetation in drug discovery, modern views, and challenges [1].

Herbal drugs are necessary for traditional medicine in some countries as well as China and India. Ayurveda is a well-developed medicinal system in India where we make use of plants, animals, and minerals to treat various illnesses. The Indian government has taken some initiatives to develop, the technology for the effective conservation and proper utilization of medicinal plants. Priority of the biotechnology department, Indian government, and Indian council of agricultural research prescribed the top 20 medicinal plants in India, so we have a huge demand for medicinal plants in the field of pharmacy. Scientific validation of the therapeutic activity of old-age drugs used in Ayurveda reinforces faith in the traditional system [2].

Caesalpinia crista (*Caesalpinia Chinensis Roxb., Caesalpinia kwangtungensis Merr., Caesalpinia laevigata Perr., Caesalpinia nuga* (L) W.T. Aiton, *Caesalpinia paniculata* (Lam.) Rox.) belonging to the family Caesalpiniaceae. It is found distributed in Indo-Malesia to Polynesia, Indian distribution. State – Kerala districts; Alappuzha, Kozhikkode, Kollum [3].

Fig 1. The *Caesalpinia crista* flowring plant.

The common vernacular names for *Caesalpinia crista* (Fig 1) are Kiri gejjuga, sannagejjuga (Kannada), Latakaaranj (Hindi), Kazhanchi (Malayalam), Mut-konarai (Tamil), Mullutige (Telugu), Kantakikaranja (Sanskrit), Crested fever nut (English) [4].

Many synthesized drugs are available in the market we performed anthelmintic activity using crude extract of *C. crista* due to its low toxicity level. The juice of leaves is used as an anthelmintic. The root bark is good for tumors and for removing the placenta. The flower is bitter, heating the body, and curing Kapha and Vata. The fruit is an aphrodisiac and cures urinary discharges, piles, and wounds. The oil from the fruit is good for indolent ulcers [5].

The objective of the study is to explore the anthelmintic activity of the roots of *C. crista*.

MATERIALS AND METHODS:

Chemicals and reagents:

All the chemicals and reagents used were obtained in high-purity analytical grade from S.D. Fine Chemicals Pvt. Ltd., Bombay, India, and Merck Pvt. Ltd., Bombay, India.

Collection and authentication of the plant:

Root was collected from the surroundings of Hulikunte Village, Challakere taluk, Chitradurga district. Karnataka, India, Dated 4 January 2022. The plant was authenticated by Prof. C.N. Venktesh, M.Sc., Head, Dept. of Botany, SJM College of Arts, Science and Commerce, Holalkere road Chitradurga-577502.

Extraction procedure:

The root bark of *C. crista* was dried in shade and pulverized. The powder is then subjected to Soxhlet extraction for continuous hot extraction with ethanol (95%). About 20 g of the powdered sample of the plant was covered with filter paper. The 250 ml of ethanol solvent was used in the continuous hot percolation extraction using the soxhlet apparatus for 72 h. The filtrate was evaporated to dryness in a rotary evaporator maintained at 45 °C to remove residual solvents. Then it is stored in screw-capped bottles for further use [6].

Phytochemical Screening:

The ethanol extract of *C. crista* was evaluated for the presence of phytochemicals that are Alkaloids, Glycosides, Saponins, Terpenoids, Sterols, Flavonoids, Proteins, Amino acids, Tannins, and starch, as per the standard procedure mentioned in the specified book [7,8].

ANTHELMINTIC ACTIVITY:

The ethanolic extract of the root bark of *C. crista* was screened for anthelmintic activity by using earthworms. Three earthworms of nearly equal size (8+1 cm) were placed in standard drug solution and test compound's solutions at room temperature. Normal saline used as a control sample was also tested. The standard drug and test compounds were dissolved in a minimum quantity of dimethyl formamide (DMF) and adjusted the volume up to 15 ml with normal saline solution to get the concentration of 0.1, 0.2, and 0.5 % w/v. Albendazole citrate was used as a standard drug. The compounds were evaluated by the time taken for complete paralysis and death of earthworms. The mean paralysis time and mean lethal time for each newly tested compound were recorded (each reading was taken in triplicate and compared with that of the standard drug). The time taken by worms to become motionless was noted as paralysis time. To ascertain the death of the motionless warms, the earthworms were frequently applied with external stimuli, which stimulate and induce movement in the worms, if alive [9-12].

Table 1. The results of qualitative tests for preliminary phytoconstituents.

Test	Inference
Alkaloids	
(a) Dragendroff's test	+
(b) Hager's test	+
(c) Wagner's test	+
(d) Mayer's test	+
Carbohydrates	
(a) Anthrone test	-
(b) Benedict's test	-
(c) Fehling's test	-
(d) Molisch's test	-
Flavanoids	
(b) Shinoda's test	+
Proteins	
(a) Biurat's test	-
(b) Millon's test	-
Saponins	-
Steroids	
(a) Libermann-Burchard's test	-
(b) Salkowaski reaction	-
(c) sulphur test	-
Starch	-
Tannins	+
Resins	-

(+) – Present and (-) – Absent.

RESULTS AND DISCUSSION:

Phytochemical screening:

The result of qualitative tests for preliminary phytoconstituents is given in Table 1. The preliminary phytochemical studies revealed that there was the presence of Alkaloids, Flavonoids, Triterpenoids, Steroids, and Tannins from the ethanolic extract of the root of *C. crista*.

Anthelmintic activity:

The anthelmintic activity data of the root bark of *C. crista* is given in Table 2, Fig 2, and 3. It is observed that the ethanolic extract of *C. crista* is significantly showing anthelmintic activity in a concentration-dependent manner. The anthelmintic activity shown by the plant *C. crista* is well comparable with the standard drug albendazole. As the dose of the *C. crista* extract is increased the anthelmintic activity gets increased. From the data, it is revealed that the *C. crista* root ethanolic extract showed greater anthelmintic activity than the standard drug albendazole.

Table 2. The anthelmintic activity of *C. crista* root bark extract.

Name of the compounds	Conc. (% m/v)	Time (min)	
		Paralysis	Death
Control	0.9	--	--
Albendazole	0.1	78	103
	0.2	69	89
	0.5	40	53
Alcoholic extract	0.1	45	78
	0.2	35	55
	0.5	26	49

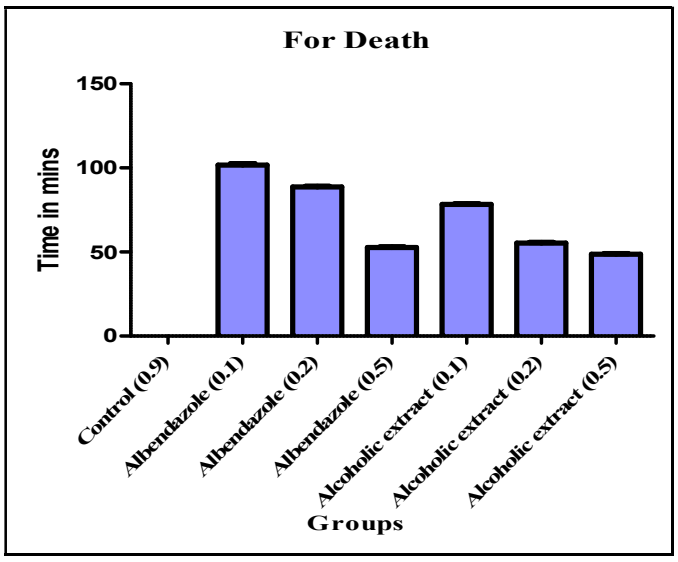

Fig 2. The anthelmintic activity (Death time of worth worm) *C. crista* root bark extract.

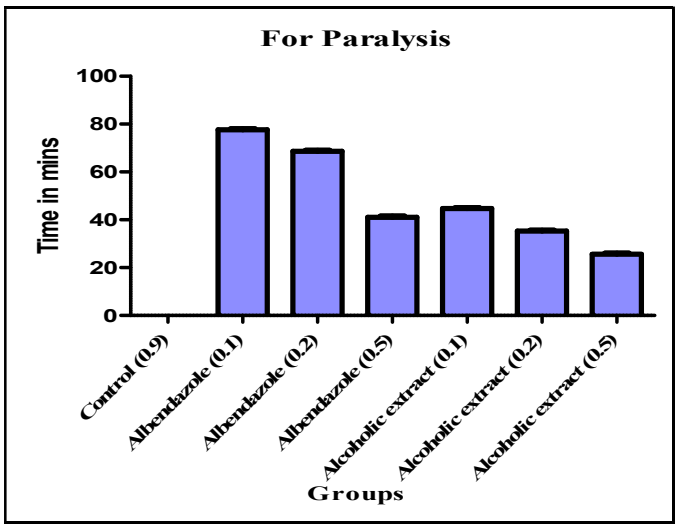

Fig 1. The anthelmintic activity (Paralysis time of worth worm) *C. crista* root bark extract.

CONCLUSION:

The present research concluded that the ethanolic extract of the root bark of *C. crista* showed potent anthelmintic activity. Further study needs to be carried out to explore the chemical constituent which is responsible for exhibiting this anthelmintic activity.

ACKNOWLEDGEMENT

The authors are thankful to SJM College of Pharmacy, Chitradurga for providing all necessary facilities through the Principal.

REFERENCES:

1. Parasuraman S. Herbal drug discovery: challenges and perspectives. Curr Pharmacogenomics Pers Med, 2018; 16(1): 63-68.
2. The Indian herbal drugs scenario in global perspectives. In: Ramawat KG, Goyal S, editors. Bioactive molecules and medicinal plants. Berlin: Springer; 2008. pp. 325-347.
3. Kritikar K, Basu B. Indian Medicinal Plants. Vol. II. Dehradun: International Book Distributors; 1999. pp. 842-845.
4. Mishra D, Sarkar DK, Nayak BS, Rout PK, Ellaiah P, Ramakrishna S. Phytochemical investigation and evaluation of anthelmintic activity of extract from leaves of Eupatorium odoratum linn. Indian J Pharm Educ Res, 2010; 44(4): 369-374.
5. Wadkar GH, Kane SR, Matapati SS, Hogade MG. *In-vitro* anthelmintic activity of *Caesalpinia bonducella* (Linn). Flem. leaves. Journal Pharmacy Res, 2010; 3(5): 926-927.
6. Nayak BS, Jena PK, Dinda SC, Ellaiah P. Phytochemical Investigation and *in vitro* Evaluation of Anthelmintic Activity of Gmnelina arborea roxb. Fruit Extracts. Asian J Chem, 2012; 24(8): 3445-3447.
7. Sembiring EN, Elya B, Sauriasari R. Phytochemical Screening, total Flavonoid and total Phenolic content and antioxidant activity of different parts of *Caesalpinia bonduc* (L.) Roxb. Pharmacogn J. 2018; 10(1): 123-127.
8. Jabbar A, Zaman MA, Iqbal Z, Yaseen M, Shamim A. Anthelmintic activity of *Chenopodium album* (L.) and *Caesalpinia crista* (L.) against trichostrongylid nematodes of sheep. J Ethnopharmacol, 2007; 114(1): 86-91.
9. Kumar T, Alexander A, Dewangan D, Khan J, Sharma M. Investigation of *in-vitro* anthelmintic activity of *Bauhinia racemosalinn*. J Appl Pharm Sci, 2011; 1(2): 73-75.
10. Kushwah P, Kayande N. Evaluation of Antihelmintic activity of root of *Butea monosperma*. PharmaTutor, 2014; 2(6): 171-173.
11. Manoj S, Janadri S, Das A. Anthelmintic activity of ethanolic extract of Annona reticulata bark. J Pharm Adv Res, 2022; 5(1): 1441-1445.
12. Nayak BS, Jena PK, Sahu NP, Nayak UK, Patro KB. Comparative study of anthelmintic activity between aqueous and ethanolic extract of *Solanum surattense* Linn. Int J Pharmacy Pharm Sci, 2009; 1(1): 103-107.

Conflict of Interest: None
Source of Funding: Nil
Paper Citation: Pavankumar M*, Vijay Kumar MMJ, Basavaraja HS, Vinay R,Vikas R Mathad, Akkamma HG, Pavitra hedge, Prajwal J. Phytochemical investigation and *in-vitro* Anthelmintic activity of root of *Caesalpinia crista*. J Pharm Adv Res, 2022; 5(12): 1750-1753.