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A Comparative Anthelmentic Studies on Jasminum Grandiflorum and Cordia Diachotoma

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ABSTRACT

Anthelmintics are a class of antiparasitic drugs that eliminate parasitic worms (helminths) and other internal parasites from the body by stunning or destroying them without harming the host. They're also known as vermifuges (stun drugs) or vermicides (drugs that destroy vermin) (those that kill). Anthelmintics, a disease called helminthiasis, are used to treat individuals that are infected by helminths. For the care of infected animals, these medications are sometimes used. The extraction from leaves of Jasminum Grandiflorum and Cordia Dichotoma was done by soxhlet apparatus for 3 days by using alcohol (Ethanol) as solvent. After that the evaporation of solvent was done for obtaining solid form of extract. Phytochemical screening of solid form of extract was performed to study its contents (Eg. Tannins, Alkaloids, Anthocynin, steroids, etc.)Cordia Dichotoma and Jasminum Grandiflorum extracts in ethanol were taken for anthelmintic activity against Parthitima Postuma which is an Indian earthworm. Various quantities of both extract were monitored and the results were expressed for paralysis and bacterial death time. Distilled water used as acontrol group. Dependent Activity of the dose of both plants was observed But Jasminum grandiflorum shows more activity than Cordia diachotoma .It was concluded that Both the studied plants had some anthelmintic activity, therefore, in vivo trials may be conducted for further.

Keywords : Jasminum Grandiflorum, Cordia Dichotoma, Anthelminthic Activity, Molecular Docking.

I. INTRODUCTION

Anthelmintics are a group of antiparasitic medicines that work locally to extract worms from the gastrointestinal tract or to eliminate adult helminths or types of growth systematically without causing significant host harm[1]. Natural anthelmintic agents can play an important role in the treatment of parasitic infections. *Jasminum grandiflorum* has been reported to have beneficial effects such as odontalgic, thermogenic, aphrodisiac, antiseptic, emollient, anthelmintic, deobstructive, suppurative, tonic,

stomatitis, leprosy, skin diseases, otorea, otalgia, wounds, calluses, and aromatherapy in fixing loose teeth[2]. Our careful literature search revealed an interesting fact that although the plant is a popular remedy for a variety of disorders; very little effort has been made to verify its effectiveness through scientific screening on animal models and clinical studies[3]. The present study illustrates the numerous common, phytochemical and pharmacological uses of *J. Grandiflorum* and stresses its unexplored ability as well[4]. *Cordia diachotoma* his having the fruit contains saponins, amino acids, flavonoids, sugar, rubber, proteins, palmitic acid, stearic, linoleic, oleic, arachidic, behenic acid. Its fruits are used as cooling, astringent, diuretic, aphrodisiac, emollient, expectorant, anthelmintic and purgative[5]. The hazels were a good remedy in the dens. Analgesics, anti-inflammatories and hepatoprotectives have also been reported by the plant. The current research was conducted to scientifically assess the anthelmintic behavior of Cordia dichotoma[6].

The presence of phytochemicals such as steroids, terpenoids, carotenoids and flavanoids exhibiting antimicrobial, heamolytic and foaming activity was demonstrated by screening phytochemicals present in the leaf extracts of *Jasminum grandiflorum* and *Cordia dichotoma* [7] . Environmental factors can influence plant growth, such as soil conditions, temperature, altitude and precipitation, and in turn influence the production of phytochemicals in them[8]. The purpose of this research was to investigate the presence of phytochemical constituents in two different solvent extracts and the anthelmintic behavior of *Jasminum grandiflorum* and *Cordia dichotoma* ethanolic extract.

II. METHODS AND MATERIAL

2.1 Collection and identification of plant and worms

The test plant, *Jasminum grandiflorum* was collected from Modern Highschool, Sakhrale, Sangli, Maharashtra, India and Cordia dichotoma was collected from Yewalewadi Corner, Kasegaon, Sangli, Maharashtra . Dr. G. G. Potdar, Assistant Professer, Yashvantrao Chavan College of Science Karad, Maharashtra, India, authenticated this plant. Using an electric grinder, shade-dried leaf samples were cleaned, washed, dried and pulverized into coarse powder.

Pheretima posthuma (Indian earthworm) were collected from Rajarambapu Vermicompost Project, Rajaramnagar, Islampur, Sangli, Maharashtra, India and Dr..S U Patil. Head, Department Of Zoology, Smt. Kusumtai Rajarambapu Patil Kanya Mahavidyalaya, Islampur, Sangli, Maharashtra authenticated this earthworm.

2.2 Extraction

The dried leaf powder (20 g) of *Jasmine grandiflorum* leaf and *Cordia diachotoma* leaf was extracted separately by ethanol by keeping them in respective solvents for 48 hours with soxhlet apparatus and then evaporated to dryness and air dried at room temperature.

2.3 Phytochemical Analysis

The phytochemical constituents present in *Jasminum grandiflorum* leaf and *Cordia dichotoma* were carried out with solvent extracts as mentioned as follow using standard methods[9,10,11,12].

Sr. No.	Phytochemical	Test	Positive Observation
1	Alkaloids	1ml of extract adds 1% HCl and 6 drops of Mayer's reagent and few drops of Dragendroff's reagent.	Organic precipitate indicate that presence of alkaloid
2	Flavonoids	5ml of dilute ammonia solution were added to a portion of aqueous filtrate of extract followed by addition of con. H_2SO_4.	A yellow coloration is observed which confirms the presence of flavonoids.

3	Terpenoids	5ml of extract was added to 2ml of chloroform and 3ml of con. H_2SO_4.	Formation of reddish brown monolayer at coloration of the interface was showed to form positive result for terpenoids.
4	Tannins	5ml of extract was added to few drops of 1% lead acetate.	A yellow precipitate indicates presence of tannin.
5	Saponins	5ml of extract was added to 20ml of distilled water was agitated in a graduated cylinder for 15 minutes.	The formation of a layer of foam indicates the presence of saponins.
6	Coumarins	3ml of 10% NaOH was added to 2ml of aqueous extract	Formation of yellow color indicates the presence of cumarins
7	Emodins	2ml of NH_4OH and 3ml Benzene was added to the extract.	Appearance of red color indicates the presence of emodin
8	Anthocyanins	2ml of aqueous extract is added to 2ml of 2N HCl and ammonia.	The appearance of pink-red turns blue violet indicates the presence of anthocyanin.
9	Leucoanthocyanins	5ml of aqueous extract added to 5ml of isoamyl alcohol	Upper layer appears red in color indicates for presence of leucoanthocynin.
10	Steriods	1ml of the extract was dissolved in 10ml of chloroform and equal volume of concentrated sulphuric acid was added by sides of the test tube.	The upper layer turns red and sulphuric acid layer showed yellow with green fluorescence indicate the presence of steroids.
11	Phlobatinins	aqueous extract were boiled with 1% aqueous HCl	red precipitate was deposition indicate the presence of phlobatinins

III. ANTHELMINTIC ASSAY

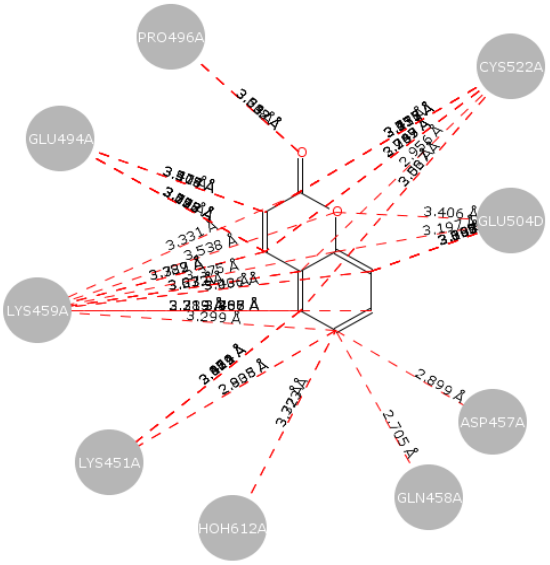
3.1 In vivo Anthelmintic activity

The *P. posthuma* earthworm was divided into seven groups consisting of two earthworms of equal size in each group and released into 30 ml of the experimental formulation contained in a petri plate. The first group served as control treated with usual distilled water only, The ethanolic extract of *Jasminum grandiflorum* at different concentrations (5, 10 and 15 mg/ml) constituted the second, third and fourth group and ethanolic extract of *cordia dichotoma* at different concentrations (5, 10 and 15 mg/ml) constituted the fifth , sixth and seventh group. Before initiating the experiment, all the test solutions and regular solutions were freshly prepared. The mean paralysis time was observed when no earthworm movement could be observed and the death time was documented in minutes after confirming that worms did not move when shaken or when external stimuli were given by putting the motionless worms in 50ºC hot water[13]. When the worms were unable to move and the presence of a white secretion and the color of their body around

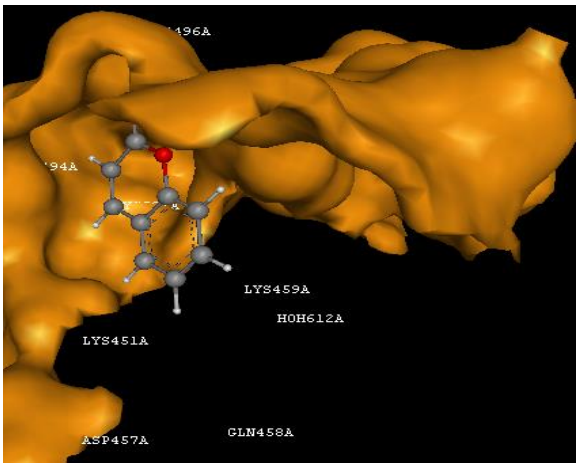
their body diminished, the deaths of the worms were confirmed. It expressed the time for paralysis and death as minutes.

3.2 Anthelmintic activity by Molecular Docking

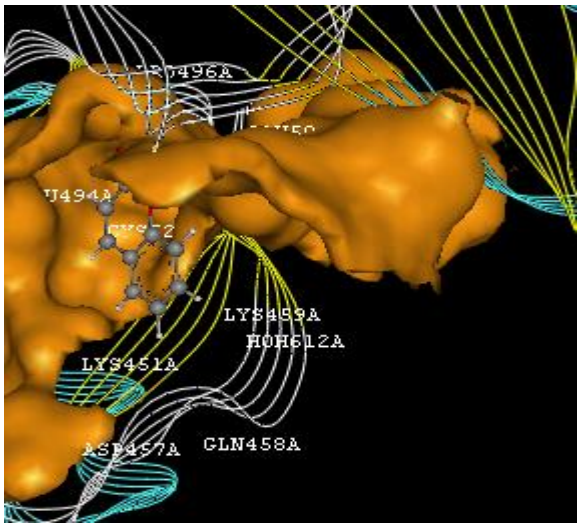
The molecular docking of compound was done into the three-dimensional X-ray structure (PDB code: 4ICU). The VLifeMDS 4.1 software was used for the docking studies. This automated method is useful for studying the binding mode of ligands binding to biomacromolecules. The three-dimension structures of ligand molecules were built, optimized (3D), and saved in PDB format using the molecular modeling program BioPredicta (VLifeMDS 4.1, pune). All non-protein atoms were deleted, and VLifeMDSTools was used for creating 3D files from primary 2D PDB files. Hydrogen atoms were added using VLifeMDSTools (Ver. 4.1). In the present docking study, the in-silico molecular design method, implemented in the program VLifeMDS 4.1, was employed. All default docking parameters were maintained.



2D Image of Cumarine



3D Image of Cumarine



Super Impose Image of Cumarine

IV. RESULT

Table 2 : Phytochemical constituents present in extracts

Sr. No.	Phytochemical	*Jasminum Grandiflorum*	*Cordia dichotoma*
1	Alkaloid	+	+
2	Tannis	+	-
3	Anthocynin	-	-
4	Flavonoids	+	+
5	Terpenoid	+	+
6	Coumarin	-	-
7	Steroids	+	+
8	Phlobatins	-	-

Table 3 : Anthelmintic activity

Group	Extract	Dose (mg/ml)	Paralysis time (min)	Death time (min)
1	Control	-	-	-
2	*Jasminum grandiflorum*	5mg/ml	77.01 min	85.2 min
			138.50 min	145.5 min
3	*Jasminum grandiflorum*	10mg/ml	71.30 min	78.6 min
			133.50 min	139.0 min
4	*Jasminum grandiflorum*	15mg/ml	67.37 min	71.0 min
			128.12 min	131.5 min
5	*Cordia diachotoma*	5mg/ml	77.06 min	76.2 min
			137.20 min	137.6 min
6	*Cordia diachotoma*	10mg/ml	71.30 min	73.2 min
			132.20 min	133.4 min
7	*Cordia diachotoma*	15mg/ml	69 min	72.5 min
			129.40 min	135.9 min

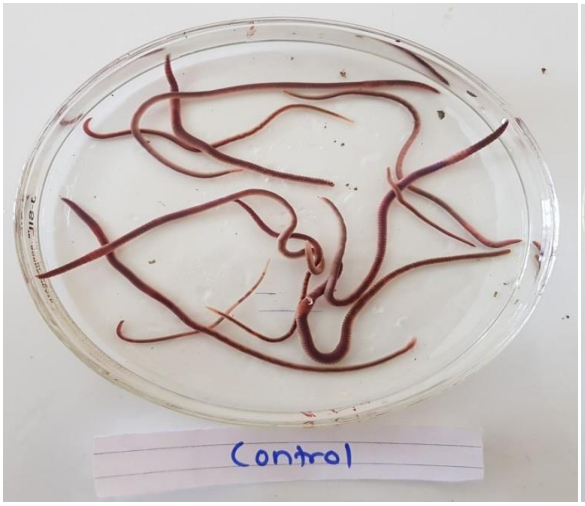


FIG 1 : CONTROL

FIG 2 : *J. gradiflorum* (5mg/ml)

FIG 3: *J. grandiflorum* (10mg/ml)

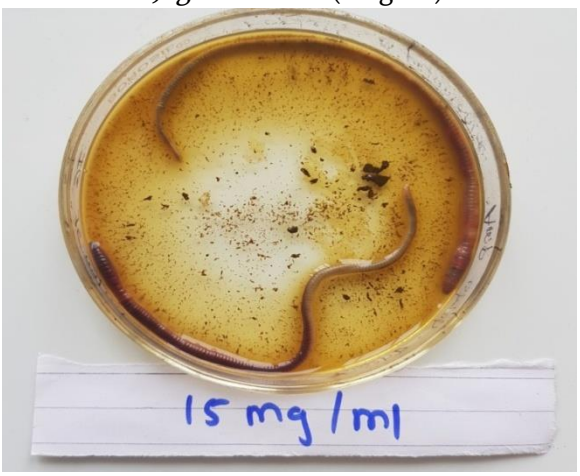


FIG 4: *J. grandiflorum* (15mg/ml)

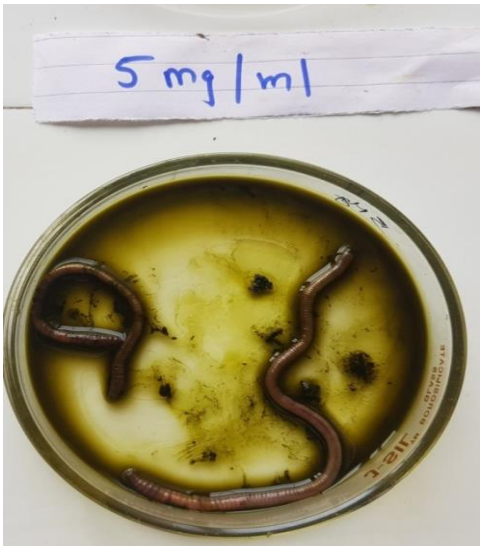


FIG 5: *C. diachotoma* (5mg/ml)

FIG 6: *C. diachotoma* (10mg/ml)

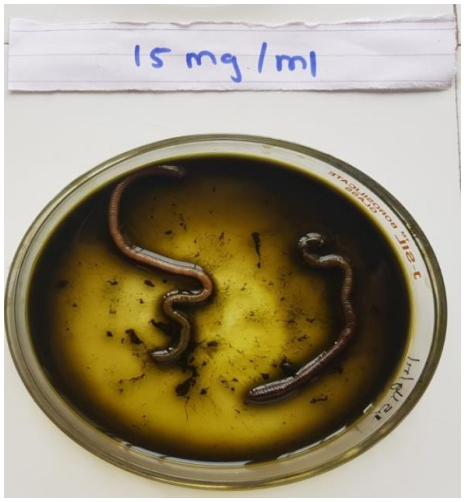


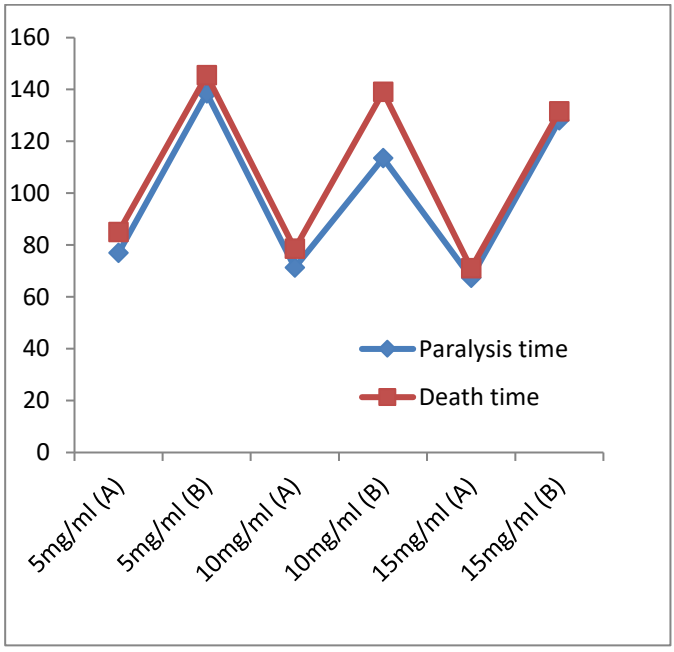
FIG 7: *C. diachotoma* (15mg/ml)

Preliminary phytochemical screening has shown the presence of saponin, steroid, alkaloid, tannin, flavonoid in ethanolic extract. From the above table, it is observed that *Jasminum grandiflorum* shown potent anthelmintic activity while *Cordia diachotoma* has taken long time for death of worms. *Jasminum grandiflorum* is showing paralysis within 7 – 8 minutes while death of worms takes place 1 hour 55 minutes. *Cordia diachotoma* is showing paralysis within 9 – 10 minutes while death of worms takes place in 2 hours 30 minutes. Future scope involves need of isolation of phytoconstituent responsible for activity

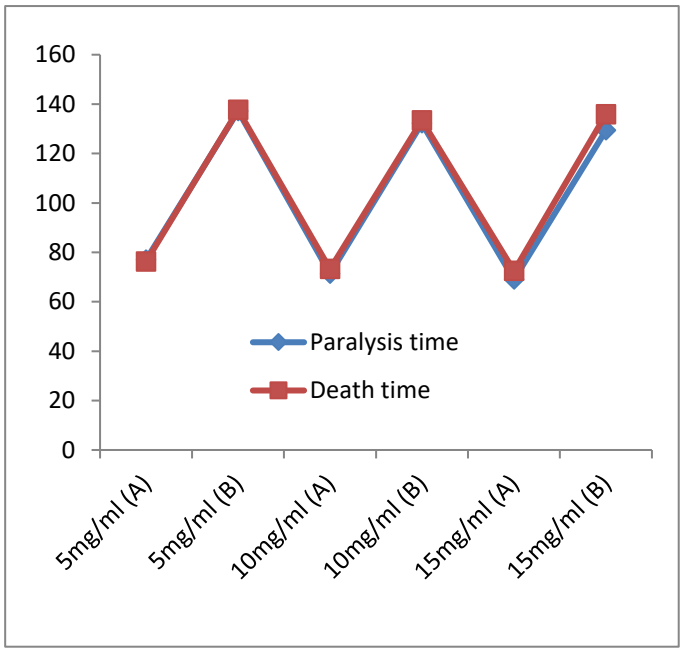
V. DISCUSSION

Different plants would have different chemical constitution and the composition of these chemicals may vary from one part to another part within the same plant. In order to determine the soluble phytochemical constituents, *Jasminum grandiflorum* and *Cordia dichotoma* were therefore chosen to prepare ethanolic extracts using two separate methods. The present investigation revealed the presence of phytochemicals in ethanolic solvent extracts of *Jasminum grandiflorum* and *Cordia diachotoma* leaf, such as alkaloids, glycoside, coumarin, saponins, flavonoids and tannins. In *Jasminum grandiflorum* ethanolic extract, more phytochemicals and the

highest extractive percentage (11.6 percent) were found and showed the highest anthelmintic activity. Phytochemicals, also known as secondary metabolites, are found in complex mixtures that vary by plant organ and growth stage[14]. Knowing the phytochemical constituents of Jasminum grandiflorum and Cordia dichotoma leaves will help you get the most out of this plant in terms of medicine. Vital sources of antiviral, antitumor and antimicrobial agents have been identified as phytochemicals contained in plants and are therefore used as constituents in allopathic medicine[15] and in other medical systems as well. In the current study, anthelmintic activity of ethanolic leaf extracts of *Jasminum grandiflorum* and *Cordia dichotoma* was tested against *P. posthuma* which resembles intestinal worms in their reaction to anthelmintic agents and are easily available. The *Cordia dichotoma* ethanolic extract exhibited poor anthelmintic activity when compared to *Jasminum grandiflorum* ethanolic extract and the standard drug albendazole (BENDEX Suspension). The highest anthelmintic activity can be responsible for the occurrence of alkaloids and tannins in ethanolic extract. As the concentrations increased, the anthelmintic activity of ethanolic extracts increased. Bendgude et al.[16] also reported that the standard reference drug, albendazole, ethanolic extracts greatly decreased the paralysis and death time of worms in a dose-dependent way. Phytochemicals like alkaloids, phenols, etc. shows important anthelmintic activity[17] has been reported to function on the central nervous system and cause earthworm paralysis. Tannins have been reported to interfere with worm power generation by uncoupling oxidative phosphorylation or binding to the gastrointestinal tract's free protein and leading to worm death[18]. Together or separately, phytochemicals can work by inhibiting tubulin polymerization and blocking glucose uptake[19] and damaging the mucopolysaccharide membrane of worms, exposing the outer layer and restricting their earthworm movement, which can eventually cause paralysis and ultimately death[20].



Graph 1: *Jasminum grandiflorum*



Graph 2: *Cardia diachotoma*

VI. CONCLUSION

By performing extraction of *Jasminum grandiflorum and Cordia diachotoma* it was found that both extract contain cumarine as active constituent for anthelmintic activity. It was concluded that *Jasminum grandiflorum* shows more activity than

Cordia diachotoma. Further work will emphasize the isolation and characterization of active principles responsible for anthelmintic activity of leaf extracts of *Jasminum grandiflorum and Cordia diachotoma.*

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