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PHARMACOGNOSTICAL, PHYTOCHEMICAL AND ANTHELMINTIC ACTIVITY ON FLOWERS OF *JASMINUM GRANDIFLORUM* LINN. (OLEACEAE)

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ABSTRACT: *Jasminum grandiflorum* Linn. is a scrambling deciduous shrub. Its leaves are used as Ayurvedic herbal medicine, and its flowers are used to adorn the coiffure of women. The plant is bitter, astringent, acrid, thermogenic, aphrodisiac, antiseptic, anodyne, depurative, emmenagogue, emollient, diuretic, anthelmintic, deobstruent, dentifrice, suppurative tonic. Since, the literature has restricted *Jasminum grandiflorum* Linn. with agricultural and botanical limits, efforts were undertaken to unmask the extremely useful yet hidden therapeutic potential of the plant. Pharmacognostical and phytochemical analysis revealed the major presence of flavonoids, carbohydrates, alkaloids, glycosides and few other constituents. Pharmacological study of four extracts (n-hexane, chloroform, ethyl acetate, and ethanolic extracts) on the flowers of *Jasminum grandiflorum* Linn. was prepared and screened for its anthelmintic activity using indian adult earthworms (*Pheretima posthuma*). Ethanolic extract was found to be more potent and effective out of the four extracts.

INTRODUCTION: *Jasminum grandiflorum*, also known variously as the Spanish jasmine, Royal jasmine, Catalonian jasmine is a species of jasmine belonging to the family Oleaceae. It is a scrambling deciduous shrub growing 2-4m tall. It is native of Asia, Kashmir, Afghanistan, and Persia ascending to an altitude of 700- 2700 m, cultivated in India, wild in subtropical North-West Himalayas, Western Ghats, Nilgiris, the hill of Tinnavally above 1400 m, France, Italy, China, Japan, India, Morocco, and Egypt.

The plant is documented to possess beneficial effects such as odontalgic, thermogenic, Aphrodisiac, antiseptic, emollient, anthelmintic, deobstruent, suppurative, tonic, in fixing loose teeth, ulcerative stomatitis, leprosy, skin diseases, otorrhea, otalgia, wounds, corns, and Aromatherapy. Our thorough literature search revealed an interesting fact that though the plant is a popular remedy for a variety of ailments, very little effort have been made to verify its efficacy through scientific screenings in an animal model and clinical trials¹.

Anthelmintics or antihelminthics are a group of antiparasitic drugs that expel parasitic worms (helminths) and other internal parasites from the body by either stunning or killing them and without causing significant damage to the host.

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They may also be called vermifuges (those that stun) or vermicides (those that kill). They are used to treat people or animals that are infected by helminths, a condition called helminthiasis.

The present study highlights the anthelmintic activity of *Jasminum grandiflorum* flower extracts of hexane, chloroform, ethyl acetate, and ethanol.

Taxonomical/ Scientific Classification ²:

Kingdom : Plantae- Plants
 Subkingdom : Tracheobionts- Vascular plants
 Division : Magnoliophyta- Flowering plants
 Class : Magnoliopsida- Dicotyledons
 Order : Scrophulariales
 Family : Oleaceae- Olive family
 Genus : *Jasminum*
 Species : *grandiflorum*

Classical Names: Jati, Sauanasyayani, Sumama, Chetika, Hridyagandha, Malati, Rajaputrika ^{3,4}.

MATERIALS AND METHODS:

Collection and Identification of Plant Material:

The fresh flowers of *Jasminum grandiflorum* Linn (Oleaceae) was collected from the domestic source in and around Chennai, Tamil Nadu, India. The specimen no: PARC/ 2016/3215. A voucher specimen was deposited in the Department herbarium library, Department of Pharmacognosy, Madras Medical College for reference.

Morphological Studies: The fresh flowers were studied morphologically.

Microscopical Studies: The dried flowers are coarsely powdered and used for powder microscopical studies. The powder was treated with phloroglucinol and hydrochloric acid, N/10 Iodine, Glycerin water and observed under the microscope.

Physicochemical Constants: ⁵⁻⁸ Shade dried powdered plant material of flowers of *Jasminum grandiflorum* Linn (Oleaceae), was used for the determination of physicochemical constants such as Determination of Ash Values (Total ash, Water soluble ash, Acid insoluble ash, Sulfated ash), determination of solvent extractive values (Water

soluble extractive value, Alcohol soluble extractive value) and Loss on drying. The results are shown in **Table 1**.

Preparation of Extract: The fresh flowers of *Jasminum grandiflorum* Linn. (Oleaceae) were air dried in the shade and coarsely powdered to prevent the loss of active phytoconstituents, samples were kept under constant observation to avoid any fungal growth.

Extract Preparation: The dried coarsely powdered plant material of flowers of *Jasminum grandiflorum* Linn. (Oleaceae) were successively extracted using a soxhlet apparatus with solvents of increasing polarity such as hexane, chloroform, ethyl acetate, ethanol at 60-70 °C for 18 h. All the extracts were redistilled and concentrated under rotary vacuum evaporator. The extracts were tested for qualitative analysis.

Preliminary Phytochemical Evaluation: The preliminary phytochemical screenings of extracts were carried out as per standard procedures ⁹⁻¹⁵. The results were shown in **Table 2**.

Fluorescent Analysis ¹⁶⁻¹⁷: Fluorescent analysis was carried out according to the method of Chase and Pratt (1949) and Kokoshi *et al.*, (1958) in daylight and UV light. The plant powders and extracts were treated with different solvents, and the fluorescence was observed in daylight and UV light and results were tabulated in **Table 3** and **4**

Thin Layer Chromatography: ¹⁸⁻¹⁹ The extracts were run in the following mobile phase.

n-butanol: Glacial acetic acid: Water – (4:1:5)
HCl: Formic acid: Water – (19:39.6:41.4). The results were summarized in **Table 5**.

Pharmacological Studies:

In-vitro Anthelmintic Activity:

Preparation of the Extract: The hexane, chloroform, ethyl acetate, and ethanol extracts were prepared by dissolving 5 mg, 10 mg, 50 mg of extracts of flowers of *Jasminum grandiflorum* Linn. (Oleaceae) in their respective solvents.

Earthworm: Indian adult earthworm (*Pheretima postuma*; Annelida, Megascolecidae) collected from moist soil and washed with normal saline to

remove all matters were used for the study. The earthworm of 3-5cm in length and 0.1-0.2 cm in width were used due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings.

Evaluation of Anthelmintic activity²⁰: Hexane, Chloroform, Ethyl acetate and Ethanol extracts of flowers of *Jasminum grandiflorum* L. (Oleaceae) were screened for anthelmintic activity. Four groups each containing one worm of approximately equal size was released into 10 ml of the desired formulation. Each group was treated with one of the following vehicles: Hexane, chloroform, ethyl acetate and ethanol extracts of flowers of *Jasminum grandiflorum* Linn. (Oleaceae).

Observations were made for the time taken for paralysis and death of individual earthworm paralysis was said to occur when the worms do not revive even in normal saline. Death was concluded when the worms lose their motility followed with

fading away of their body colors. The results were summarized in **Table 6**.

RESULTS AND DISCUSSION:

Pharmacognostical Studies: The results of Pharmacognostical studies are as follows.

Morphological Studies: Flowers are borne on the terminal or auxiliary cymes longer than leaves, white, tinged purple on the outside, fragrant; bracts ovate to spatulate, oblong, foliaceous, calyx glabrous, 5-lobed, star-shaped, elliptic or obovate. The corolla tube encloses 2 stamens borne on the short, slender filament

Microscopical Studies: The powder microscopy of flowers of *Jasminum grandiflorum* Linn. (Oleaceae) showed the following characters: The powder appeared as yellowish brown, fragments of spirally thickened xylem vessels and prismatic crystals of calcium oxalate, trichomes, small starch grains, and pollen grains.

TABLE 1: PHYSICO-CHEMICAL CONSTANT ANALYSIS OF FLOWERS OF JASMINUM GRANDIFLORUM

S. no.	Total ash %	Water soluble ash %	Acid-insoluble ash %	Water-soluble extractive value%	Alcohol soluble extractive value%	Loss on drying (g)
1	14.02	6.08	4.22	3.81	3.71	0.2
2	13.06	5.55	3.66	3.64	3.50	0.3
3	13.58	6.12	3.92	3.82	3.49	0.1
4	12.96	4.48	4.01	5.20	3.00	0.1
5	13.99	5.91	2.99	3.64	4.41	0.2
MIN	12.96	4.48	2.99	3.64	2.44	0.1
AVG	13.52	5.62	3.76	4.02	3.12	0.18
MAX	14.02	6.12	4.22	5.20	4.46	0.3

TABLE 2: PRELIMINARY PHYTOCHEMICAL SCREENING OF FLOWERS OF JASMINUM GRANDIFLORUM

S. no.	Phytoconstituents	Hexane	Chloroform	Ethyl acetate	Ethanol
1	Carbohydrates	-	-	+	+
2	Flavonoids	-	+	+	+
3	Glycosides	-	-	-	+
4	Alkaloids	-	-	+	+
5	Saponin	-	-	-	-
6	Phytosterols	-	-	-	-
7	Phenolic compounds	-	-	-	-
8	Proteins	-	-	-	+
9	Fixed oils and fats	+	-	-	-
10	Tannins	-	-	-	-
11	Triterpenoids	-	-	+	-
12	Gums and mucilage	-	-	-	-

+ve – the presence of phytoconstituents

-ve – the absence of phytoconstituents

The qualitative chemical tests for the extracts showed the presence of steroids, triterpenoids and fixed oil in hexane extract and alkaloids,

carbohydrates, proteins, and tannins in the alcoholic extract.

TABLE 3: FLUORESCENCE ANALYSIS OF POWDERED DRUG OF FLOWERS OF JASMINUM GRANDIFLORUM

S. no.	Powdered drug	Day Light	UV Light
1	Powder	Light brown	Brown
2	Powder + Water	Light brown	Pale brown
3	Powder + 1M HCl	Light brown	Pale brown
4	Powder + 1M HNO ₃	Chocolate brown	Brown
5	Powder + 1M H ₂ SO ₄	Brown	Dark brown
6	Powder + 1M NaOH	Chocolate brown	Brown
7	Powder + Alcoholic NaOH	Yellowish brown	Yellowish brown
8	Powder + 1M KOH	Brown	Light brown
9	Powder + Alcoholic KOH	Dark brown	Pale brown
10	Powder + Ammonia	Yellowish brown	Dark brown

TABLE 4: FLUORESCENCE ANALYSIS OF VARIOUS EXTRACTS OF FLOWERS OF JASMINUM GRANDIFLORUM

Type of vehicle	Concentration used	Time taken (min)	
		For paralysis	For death
Hexane	5mg	17.06	19.49
	10mg	15.23	16.22
	50mg	14.39	15.58
Chloroform	5mg	13.88	15.36
	10mg	12.56	13.33
	50mg	9.37	12.09
Ethyl acetate	5mg	9.56	11.22
	10mg	7.28	10.38
	50mg	6.46	8.16
Ethanol	5mg	7.08	8.58
	10mg	6.13	7.52
	50mg	4.48	5.43

TABLE 5: TLC OF VARIOUS EXTRACTS OF FLOWERS OF JASMINUM GRANDIFLORUM

S. no.	Extracts	Solvent system	No. of Spots	R _f value
1	Hexane	n-butanol: Glacial acetic acid: Water – (4:1:5)	-	No spots
2	Chloroform	n-butanol: Glacial acetic acid: Water – (4:1:5)	1	0.62
3	Ethyl acetate	n-butanol: Glacial acetic acid: Water – (4:1:5)	1	0.79
		HCl: Formic acid: Water – (19:39.6:41.4)	1	0.80
4	Ethanol	n-butanol: Glacial acetic acid: Water – (4:1:5)	1	0.87
		HCl: Formic acid: Water – (19:39.6:41.4)	1	0.90

**FIG. 1: TLC OF ETHANOLIC EXTRACT OF JASMINUM GRANDIFLORUM LINN. SOLVENT SYSTEM: N-BUTANOL: GLACIAL ACETIC ACID: WATER – (4:1:5)**

TABLE 6: ANTHELMINTIC ACTIVITY OF FLOWERS OF *JASMINUM GRANDIFLORUM*

S. no.	Extracts	Daylight	UV Light
1	Hexane	Pale yellow	Yellow
2	Chloroform	Dark brown	Yellowish green
3	Ethyl acetate	Brownish yellow	Yellow
4	Ethanol	Brown	Pale brown

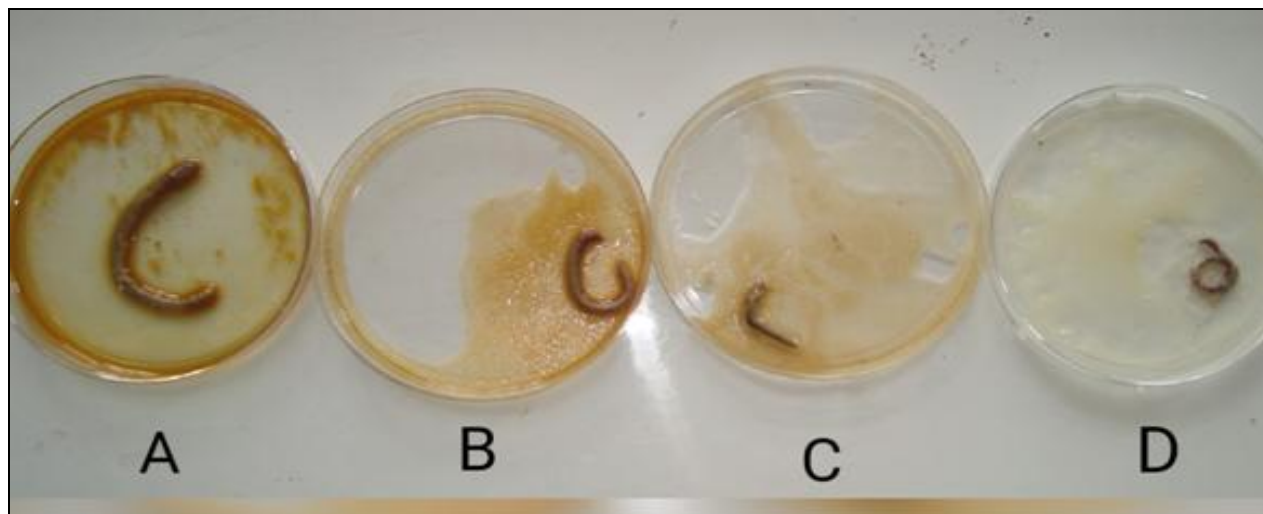


FIG. 2: ANTHELMINTIC ACTIVITY OF *JASMINUM GRANDIFLORUM* FLOWER EXTRACTS
 A) ETHANOLIC EXTRACT B) ETHYL ACETATE EXTRACT C) CHLOROFORM EXTRACT D) HEXANE EXTRACT

The effects of hexane, chloroform, ethyl acetate and ethanolic extracts on the earthworms were studied. The ethanolic extract at 50 mg showed significant anthelmintic activity.

CONCLUSION: The present study indicates that alcoholic extract of the flowers of *Jasminum grandiflorum* Linn. (Oleaceae), exerts significant anthelmintic activity. Our findings confirm that the traditional therapeutic claims of flowers of *Jasminum grandiflorum* Linn. (Oleaceae), shortly surely be able to replace the synthetic anthelmintic drugs to which there is an increased incidence of drug interactions. Further, the study of experiments involving activity guided fractionation is underway, and the study is also aimed at extensive investigation, isolation, and purification of active phytoconstituents which is responsible for the activity. It can be optimistic that the present work suggests an herbal drug of multiple therapeutic advantages and likely to be a Powerful anthelmintic drug from flowers of *Jasminum grandiflorum* Linn. (Oleaceae), can be recommended for the treatment of digestive disorders and its associated complications.

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CONFLICT OF INTEREST: Nil

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