JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

PHYTOCHEMICAL CHARACTERIZATION AND INVITRO ANTI INFLAMMATORY POTENTIAL OF LEAF EXTRACT OF *ALLAMANDA CATHARTICA* AND ITS SOLE DEVELOPMENT

Sreelakshmi K. P.[1] , Rajeena.S[2], Shweta.P.Nambiar[3] , Sumayya Farzana.H[4] , Pavan.K.Prasad[5].

[1]Assistant Professor, Department of Pharmacognosy and Phytochemistry, Nehru College of Pharmacy, Pampady, Thiruvilwamala, Thrissur, Kerala.

[2,3,4,5] Student, Nehru College of Pharmacy, Pampady, Thiruvilwamala, Thrissur, Kerala.

ABSTRACT

Allamanda cathartica, commonly known as Golden trumpet, is a fast-growing shrub recognized for its medicinal and ornamental value. This study investigates its bioactive components, which include alkaloids and flavonoids, contributing to its anti-inflammatory properties. With foot inflammation often resulting from various causes and conventional treatments leading to side effects, the herbal extract from *Allamanda cathartica* is a compelling alternative. A herbal sole was crafted from the ethanolic extract, designed to alleviate minor foot discomfort through prolonged contact. The preparation involved Soxhlet extraction of dried leaves, followed by the production of a rubber sheet coated with an herbal adhesive and ethosome gel. Evaluation of the herbal sole included physical characteristics, uniformity of weight, folding endurance, and skin irritation tests, confirming its stability and safety for topical application. This research underscores the potential of *Allamanda cathartica* in herbal therapies for foot inflammation.

Key words *: Allamanda cathartica*, Invitro anti inflammatory property, Herbal sole.

INTRODUCTION

Allamanda cathartica Linn. is a fast-growing evergreen shrub belonging to the family Apocynaceae. It is commonly known as Golden trumpet and is widely planted in tropical and subtropical parts of Asia, Africa, and South America. The plant is well known in traditional systems of medicine for its medicinal potential and ornamental value.

Alkaloids, flavonoids, iridoid lactones, glycosides, steroids, phenolic compounds, and terpenoids are among the significant bioactive components of *Allamanda cathartica* that have been identified by phytochemical investigations. These elements are responsible for the plant's varied pharmacological actions. Inflammation, discomfort, wounds, skin conditions, rheumatism, and infections have all historically been treated using various plant parts, particularly the leaves.(1)

A common clinical ailment, foot inflammation can be brought on by an accident, an infection, arthritis, extended standing, or poor circulation. It can seriously interfere with day-to-day activities and is characterized by swelling, redness, pain, and restricted movement. Gastric irritation and long-term toxicity are common side effects of conventional anti-inflammatory medications, which has raised interest in herbal therapies with fewer negative effects.

Allamanda cathartica is a good option for treating foot irritation since it has demonstrated encouraging anti-inflammatory qualities. The plant's bioactive components help in decreasing inflammatory mediators, alleviating pain, and encouraging tissue healing.(3)

Traditionally, *Allamanda cathartica* has been used to make a herbal sole that helps reduce minor foot discomfort. When applied consistently to a shoe sole, the plant's alleged anti-inflammatory qualities may help lessen discomfort, swelling, and burning feeling. Through extended contact with the foot's sole, the herbal sole offers a calming and cooling effect that enhances walking comfort.(2) It is mostly used as a supportive therapy for ailments like heel discomfort, foot weariness, and minor inflammatory disorders; however, in extreme cases, it is not a replacement for medical care.

COLLECTION OF PLANT MATERIAL

On November 5, 2025, the plant material was gathered from Pampady, Thrissur, Kerala. It was taxonomically recognized and certified by Dr. Ranjusha.P, HOD, Department of Botany, NSS College, Ottapalam. After being shade-dried for 20 to 25 days, the gathered plant material was ground into a powder using a mixer grinder and kept in an airtight container for later use.

EXTRACTION

- Dried leaves of *Allamanda cathartica* were extracted with ethanol using soxhlet apparatus.
- Leaves were dried under shaded condition at room temperature.
- Dried leaves were crushed to powder using grinding machine
- Powder was stored at room temperature in air tight container.
- To prepare ethanolic extract, leaf powder of *Allamanda cathartica* 20 gram was packed in a soxhlet apparatus with 250ml 99% ehanol.
- The extraction was carried out at room temperature for 12 hours with 2-3 cycles per hour until the extract becomes colourless.
- After extraction, sample was filtered by using Whatman No.1 filter paper and gathered in a beaker and collected in a amber bottle to avoid contamination and degradation of the bioactive material by light and temperature.

ANTI INFLAMMATORY ACTIVITY : BY ALBUMIN DENATURATION ASSAY

Assesing their ability to inhibit the denaturation of egg albumin protein.

Plant Extract/ Reference : IMEE/Diclofenac Sodium + Ethanol(Concentration:100-500

Preparation of 1% Egg Albumin : 1g of Egg Albumin Powder + Distilled water and mix thoroughly[2]

Table .01 Anti inflammatory activity by albumin denaturation assay.

REACTION MIXTURE		CONTROL MIXTURE	
REAGENTS	QUANTITY (ml)	REAGENTS	QUANTITY (ml)
IMEE/Diclofenac Sodium	2	Distilled water	2
1% Egg Albumin Solution	0.2	1% Egg Albumin Solution	0.2
Phosphate-Buffered solution	2.8	Phosphate-Buffered solution	2.8

- Incubated at 37+2 °C for 30 minutes, then heating in a water bath at 70+2 °C for 15 minutes.
- After cooling, the absorbance of was recorded at 280 nm using a UV-Vis spectrophotometer, or distilled water serving as the blank.

$$\text{Percentage Inhibition (\%)} = \frac{(\text{A control} - \text{A met}) \times 100}{\text{A control}}$$

FORMULATION OF HERBAL SOLE

Table no. 02: Formula of herbal sole[4]

SI NO	INGREDIENTS	QUANTITY
1	*Allamand cathartica*	5g
2	Rubber latex	20g
3	Formic acid	1ml
4	Gelatin	2g
5	Citric acid	0.5g
6	Soya lecithin	1g
7	ethanol	10ml
8	glycerin	5ml
9	Distilled water qs	100ml

PROCEDURE

The herbal sole of *Allamanda cathartica* is prepared by extracting dried powdered leaves with ethanol using Soxhlet extraction, followed by evaporation to obtain a concentrated extract. A rubber sheet is prepared using 1% formic acid, and a herbal adhesive is made using gelatin, citric acid, and glycerol. An ethosome gel is prepared by mixing the herbal extract with phospholipid, ethanol, and water. The rubber sheet is coated with the adhesive, followed by the ethosome layer and wire gauze. Finally, the layers are gently pressed, dried at room temperature, and finished to obtain the herbal sole[5].

EVALUATION STUDIES OF HERBAL SOLE [6]

a) **Physical Characteristics**

The physical appearance of developed sole was evaluated by using a naked-eye examination for its appearance, colour, flexibility and smoothness.

b) **Uniformity of Weight**

Three matrix systems were taken and they were weighed individually. The readings obtained were recorded and average weight was determined.

c) **Folding Endurance**

A strip of specific area is to be cut evenly and repeatedly folded at the same place till it broke. The number of times the layer could be fold at the same place without breaking gave the value of folding endurance.

d) **Percentage Elongation Break Test**

The Percentage Elongation Break is to be determined by noting the length just before the break point, the percentage elongation can be determined from the below mentioned formula.

Elongation Percentage = [L1 – L2 / L2] × 100

Where,

L1 = Final length

L2 = Initial length

e) **Skin Irritation Test**

The prepared sole of *allamanda cathartica* was placed on the skin and tapped on the place. The sole are placed on for 20-30 minutes. The area of skin that was tested will be evaluated after the sole are removed.

RESULTS

Collection and Authentication of leaves of *Allamanda cathartica*

The leaves of *Allamanda cathartica* were collected and authenticated. These leaves were subjected to further evaluation.

EXTRACTION

Percentage yield of solvent extract

Table No 03: Observation table of Nature, Colour, Yield of *Allamanda cathartica* extract.

Extract	**Nature of extract**	**colour**	**Weight % w/w**
Ethanolic extract	Semisolid	Dark green	27.3

INVITRO ANTIINFLAMMATORY ACTIVITY TEST FOR ALLAMANDA CATHARTICA EXTRACT [4]

Table No. 04 ALBUMIN DENATURATION ASSAY

Sl. No	Sample	Concentration (µg/mL)	Absorbance at 280 nm	% Inhibition of Albumin Denaturation
1	CONTROL	-	0.652	-
2	PLANT EXTRACT	100	0.512	21.47
3	PLANT EXTRACT	200	0.468	28.22
4	PLANT EXTRACT	300	0.412	36.81
5	PLANT EXTRACT	400	0.358	45.09
6	PLANT EXTRACT	500	0.301	53.83
7	DICLOFENAC SODIUM	100	0.402	38.34
8	DICLOFENAC SODIUM	200	0.332	49.08
9	DICLOFENAC SODIUM	300	0.261	59.97

10	DICLOFENAC SODIUM	400	0.198	69.63
11	DICLOFENAC SODIUM	500	0.142	78.22

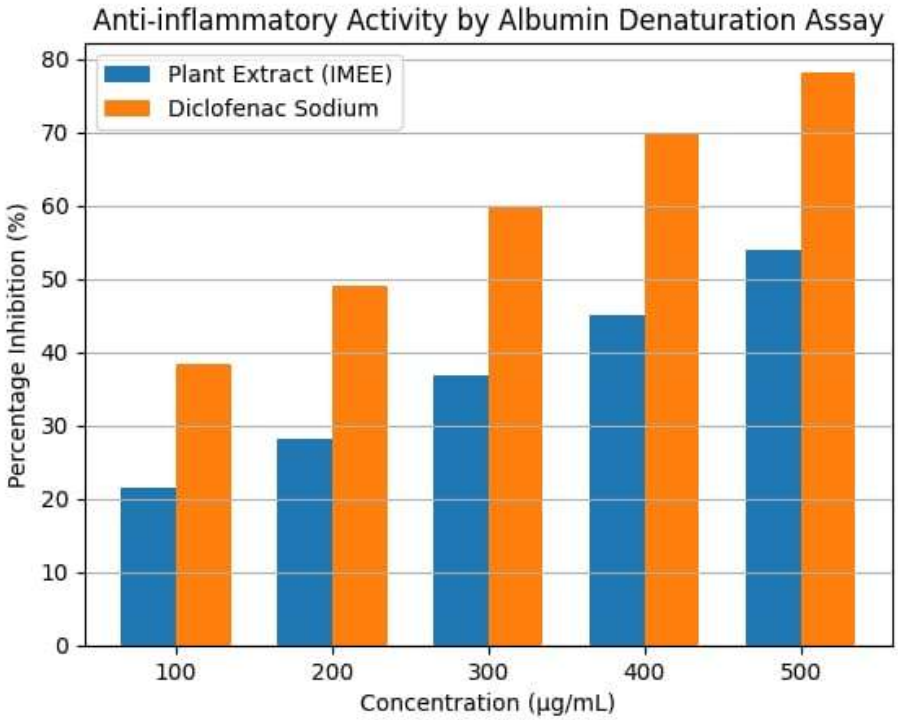

Fig.1. Anti- inflammatory activity by albumin denaturation assay

FORMULATED HERBAL SOLE

Fig.2 herbal sole

Fig.3 layering of herbal sole

EVALUATION TEST FOR HERBAL SOLE [6]

Stability studies

The formulated herbal sole was found to be stable

Table No. 05: Stability of herbal sole in different parameters.

Parameter	**Formulation**			
	initial	**5days**	**10days**	**15days**
color	Yellowish white	Yellowish white	Yellowish white	Yellowish white
odour	Pleasant herbal	Pleasant herbal	Pleasant herbal	Pleasant herbal
pH	5.0	5.0	5.0	5.0
Skin irritation	No	No	No	No

Physicochemical characterization and evaluation studies

Organoleptic test

Table No. 06: Physicochemical properties of herbal sole.

Color	**Odour**	**Texture**	**Appearance**
Yellowish white	Pleasant herbal	Smooth,uniform,non-gritty	homogenous

pH Determination

pH of the herbal sole is measured using a calibrated digital pH meter.The pH should be in the range 5.0–6.5, suitable for foot skin application

Skin Irritation Test

A small piece of herbal sole is placed on the skin (foot/patch area).The formulation should show no redness, itching, or irritation, confirming safety for topical use.

Washability

The formulation is applied on the skin and washed with water. The herbal sole should be easily washable without leaving residues.[7,8]

CONCLUSION

The leaves were gathered from the Kerala region's Pampady Thrissur district and verified. Physical constants including ash value and extractive values were determined as part of the pharmacognostic research of the leaves. The leaf's macroscopic and microscopic features were examined. Ethanol was used to extract the plant's leaves, and phytochemical analysis was performed on the extracts. Alkaloids, flavonoids, iridoid lactones, glycosides, steroids, phenolic chemicals, and terpenoids are all found in the alcoholic extract. Using the albumin denaturation assay, the leaves' anti-inflammatory properties were investigated. Inflammation in the feet can be effectively relieved by Allamanda cathartica. In order to create a herbal sole, we decided to use Allamanda Cathartica.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

ACKNOWLEDGEMENT

The authors acknowledging Nehru college of Pharmacy, Pampady, Thiruvilwamala, Thrissur, Kerala for providing for all the support.

REFERENCES

1. S B Joshi Aditi Kulkarni Gokhale. Pharmacognosy And Phytochemistry - I. 2016.
2. Sunita Verma. Medicinal plants with anti-inflammatory activity [2016 July- August] (vol 5(4)): 157-159
3. Karak, N. (2009), Fundamentals of Polymers, PHI Learning Pvt. Limited, New Delhi India.
4. Jagtap V A, Md Rageeb Md Usman, Salunkhe P S, Gagrani M B. Anti-inflammatory Activity of Calotropis gigantea Linn. Leaves Extract on invitro models. [2010 oct](vol 1 (2))
5. Yadav, Kamlesh Kumar, and Navneet Kumar Verma. "Formulation and evaluation of ethosome of meenamic acid using hot method." Journal of Chemical and Pharmaceutical Research 10.5 (2018): 4-15.
6. https://www.ijfmr.com/papers/2023/6/10753
7. Prashant Yadav, Ashok Kumar, Kanhiya Mahour and V.S.Vihan. Phytochemical analysis of Some indigenous plants potent against endoparasite [2010 July](vol (1)): 57-58.
8. R. Sanjai Kumar, D. Akhila Devi, N. Gokul Raj, M.Deepa. A review on Trandermal Drug Delivery Patches. (2022 April) (vol 34 (31 A)) : 39-47.