IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, November 2024

Extraction of Vasaka Leaf Alkaloids : A Comprehensive Review

Dinkar Pratiksha S., Gowda Aishwarya K., Bhoir Pranali S., Miss. Padwal Prachi N.
Department of Pharmacognosy
Samarth Institute of Pharmacy, Belhe, India

Abstract: *Adhatodha vasica, Commonly known as Arusa, is a valued herb in Ayurvedic medicine. Roots, leaves and preparations of the plant are tradition ally used as tonic, anti- asthmatic, analgesic, anti-inflammatory and diuretic. Adhatodha Vasica, mainly Contains Vasicine alkaloids including Vasicine which are specific to the Acanthecae family. Efficient separation and of purification of vasicine are crucial for it's.pharmaceutical application. The review aims to provide an overview of the existing methods for vasicine. Separation from vasaka leaf.Extract, including Solvent Extraction, chromatography, and crystallization techniques. Recent advancements in green extraction technologies and nanotechnology based separation methods are also explored. The review further emphasizes the importance of standardization and quality control measures to ensure the consistency and efficacy of vasicin ultra-performance liquid chromatography also used to separation and estimation of vasicine.*

Keywords: Adhatodha vasica.

I. INTRODUCTION

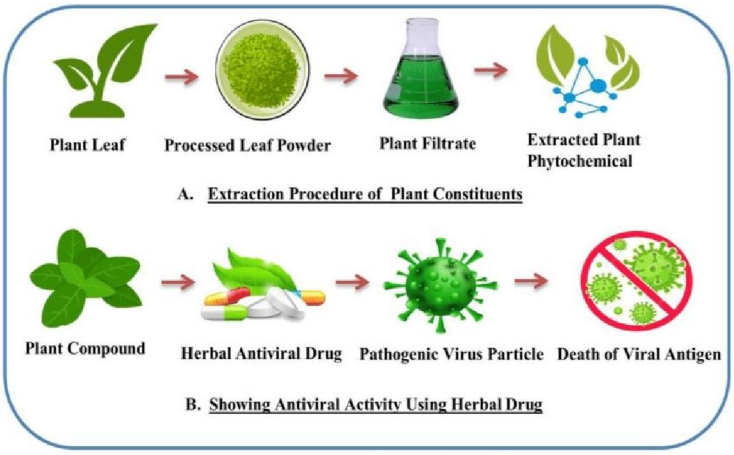
Vasaka (*Adhatoda vasica*) a medicinal plant has medicine to treat various respiratory ailments. The leaves of vasaka contain the bioactive alkaloid vasicine, responsible for its therapeutic properties Vasicine possesses. Bronchodilatory anti- Inflammatory and anti-microbial activities, making it a valuable compound for pharmaceutical applications. *Adhatoda vasica*,commonly known as Malabar Nut or Vasaka, is a perennial shrub or small tree belonging to the Acanthaceae family .It is native to India, Sri Lanka and Southeast.

Asia, and grows in tropical and subtropical regions, typically found in forests, hills, and plains. The leaves of *Adhathoda Vasica* are simple, opposite, lanceolate, measuring 10-20 an in length and 3-6cm in width with, an acute apex and rounded base. Theleaf Surface is glabrous and dark green with an entire margin. Traditionally, *Adhatoda vasica* leaves have been used to treat respiratory disorder like bronchitis and asthma, cough, cold, fever, skin diseases like eczema and acne and promote wound healing. In terms of quality Control, *Adhatoda Vasica* leaf authentication involves macroscopic, microscopic, and chromatography analysis, with checks for contamination by heavy metals and pesticides, standardization ensures the extract meets specified vasicine content. Regulatory agencies such as the FDA, WHO and Ayurveda pharmacopeia of Indiaoverdose the plant's use.

PLANT PROFILE: **VASAKA**
Botanical name: *Adhatoda vasica*
Biological source: It is dried or fresh leaves of *Adhatoda vasica* or Malabar nut
Family:*Acanthaceae*
Chemical constituents:
The major chemical constituents of vasaka are itsseveral alkaloids, and the chief one is Vasicine
Leaves composed of major constituents which are vasicine and vasicinone
The leaves of vasaka Contain vitamin C in large amount.
They also have carotene and essential oil in large amount
The roots of this plant Contain Vasicinolone, vasicol, peganine and Sitosterol

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, November 2024

SCIENTIFIC CLASSIFICATION:
Kingdom: Plantae
Sub-kingdom : Trachebionta
Division: Magnoliophyte
Class: Magnoliopsida
Sub-class: NA
Order: Lamialesad
Genus: Adhatoda



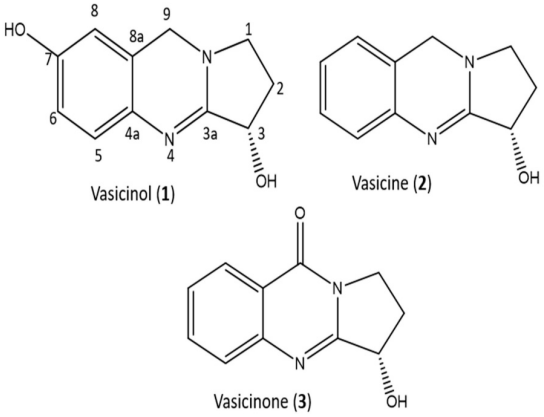
Species: Vasica
Parts used: leaves, roots, flowers, bars.

II. MATERIAL AND METHOD

1) Plant material and chemicals:
Leaves of *A.Vasica* were collected and get air dried at room temperature for removal of moisture.

2) Method for preparation of juice from vasaka leaf:
100 gm of fresh leaves were crushed using motor and pestal and 100 ml of distilled water added to it and it was subjected to heat at 121 degree (15ib pressure) for 30 min.The steamed material was taken in a 4 layered muslin cloth and squeezed in order to obtain juice out of it. The juice obtained was measured and this sample was coded as vasaka juice.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, November 2024



TESTS CONDUCTED FOR PHYTOCHEMICAL ANALYSIS

Phytochemical analysis of *Adhatoda vasica* extract helps establish its chemical profile and supports its traditional and medicinal uses by identifying the bioactive compound responsible for its therapeutic effect.

Sr.No	Name of the test	Ethanolic extract	Aqueous Ethanolic extract
1	Mayer's reagent(for alkaloids)	Positive	positive
2	Benedict's test (for carbohydrates)	Negative	Negative
3	Shinoda test(for flavonoids)	Negative	Negative
4	Foam test(for glycoside)	Positive	Positive
5	Ferric chloride test(for phenols)	Positive	Positive
6	Liebermann Buchard test(Steroids & Triterpenoids)	positive	Positive

PHYTOCHEMICAL SCREENING:

1) Thin layer chromatography:

TLC was carry out on a precoated silica gel 6oOF254 plate using vasicine as a reference standard

Mobile phase: Chloroform: Methanol (9.0:1.0)

Test solution: To 3gm of substance beging examined add 25ml of methanol heat on a water bath for 10-15 min cool and filter.

Standard solution: Dissolve 10mg of vasicine in 10ml of methnol.

Procedure: Apply 10, 1 each of the test and standard Solutions on a TLC plate as bands of 10 mm. developed the plate in air and examine under 254nm. Spray the plate with a solution of anisaldehyde sulphuric acid reagent. Heat the plate at 110 Celsius for about 5 minutes till the bands are clearly visible.

2) High Performance liquid chromatography:HPLC was performed during different trials for isolation methods, HPLC analysis was performed on shimadzu LC-20AD pump system equipped with shimadzu 5PD-20AT UV-detector with the detection wavelength set at 230nm and 20L Rheodyne injector 100 P.

A column was a reversed phase (Luna c184.6 mmx 260nm-partical size 5) eluted at a solvent system. {Acetonitrile: 1% Glacial acetic acid -6:4(V/V)}. Sample was prepared in the HPLC grade methanol.

HOW CAN GREEN TEHNOLOGY ENHANCE VASICINE SEPARATION?

Supercritical fluid extraction (SFE)- based on vasicine separation from Adhatoda vasica leaf extracts (2018)

Microwave assisted extraction (MAE) –Employs microwave energy to facilitate solvent free extraction (2019)

Ultrasound assisted extraction (UAE) - based on extraction from Adhatoda vasica leaves (2020)

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, November 2024

III. ACKNOWLEDGEMENT

We would like to express our special gratitude and thanks to our teachers as well as our principal sir who gave us this golden opportunity to do this wonderful project which also helped us in research.Guided by- Miss.Padwal mam.

IV. CONCLUSION

A.Vasaka is a valuable plant with diverse importance, offering opportunities for pharmaceutical, economical and environmental benefits addressing challenges and promoting sustainable practice will ensures it's continued utilization d conservation. Green technology plays an important and crucial role in separation of vasicin and other chemical constituents.

REFERENCES

[1]. Kumar KPS, Debjit B, Chiranjib PT, Rakesh K. (2010) Indian traditional herbs Adhatoda vasica and its Medicinal application. J Chem Pharm Res. 2(1):240-245.
[2]. Pandita K, Bhatia MS, Thappa RK, Agarwal SG, Dhar KL, Atal CK. (1983) Seasonal variation of alkaloids of Adhatoda vasica and detection of glycosides and N-oxides of vasicine and vasicinone.
[3]. Planta Medica. 48:81-82.
[4]. Meher A, Mohapatra TP, Nayak RR, Pradhan AR, Agrahari AK, Mohapatra TR, Ghosh MK. (2012) Antitussive evaluation of formulated polyherbal cough syrup. Journal of Drug Delivery & Therapeutics. 2(5), 61-64
[5]. Khandelwal KR. (2006) Practical pharmacognosy: Techniques and experiments, 13th Edition, Nirali prakashan, Delhi
[6]. Kokate CK (1997). Practicla Pharmacognosy, 4th Edn, Vallabh Prakashan, Delhi, 107-111.
[7]. Indian Herbal Pharmacopoeia (Revised new edition) Mumbai, India: Indian Drug Manufacturing Association; 2002. pp. 33-9.
[8]. Harborne JB, Williams CA. (2000) Advances in flavonoid research since 1992. Phytochemistry. 55: 481-504. [View in PubMed]
[9]. Ncube NS, Afolayan AJ, Okoh Al. (2008) Assessment techniques of antimicrobial properties of natural compounds of plant origin: current methods and future trends. Afr JBiotechnol. 7(12): 1797-1806.
[10]. 9.Eloff JN (1998). Which extractant should be used for the screening and isolation of antimicrobial components from plants? J. Ethnopharmacol. 60:1- 8. [View in PubMed]
[11]. Bimakr, M. (2010 Comparison of different extraction methods for the extraction of major bioactive flavonoid compounds from spearmint (Mentha spicata L.) leaves. Food Bioprod Process, 2: 1-6.
[12]. Wang N, Yang XW. (2010) Two new flavonoid glycosides from the whole herbs of Hyssopus officinalis. J Asian Nat Prod Res. 12(12):1044-1050.[View in PubMed]
[13]. Trease GE, Evans WC. (1989) Pharmacognosy. 13th edn., London; Bailliere Tindal: pp 176-180
[14]. Cowan MM. (1999) Plant Products as antimicrobial agents. Clin. Microbiol. Rev. 12(4): 564-582. [View in PubMed]
[15]. Pingale SS et al, (2009) Hepatosuppression by Adhatoda vasica against CCl4 Induced Liver Toxicity in Rat. Pharmacologyonline. 3: 633-639.
[16]. M. Rajni. et al, (2008) Validation of Different Methods of Preparation of Adhatoda vasica Leaf Juice by Quantification of Total Alkaloids and Vasicine, Indian Journal of Pharmaceutical Sciences 2008.
[17]. Sudharkar RS. et al, (2008) Variation in vasicine contents pharmacognostics characters of morphophytotypes from Adhatoda zylenaca medic, J. of plant science. 1816-4951.
[18]. Qureshi TA et al, (2008) Ovicidal and larvicidal properties of Adhatodavasica (1.) extra against gastrointestinal nematodes of sheep in vitro. Pakistan Vet. J., 28(2): 79-83.
[19]. Prabhalakshmi M. et al. (2006) A study on Anti- oxidant and anti-inflammatory Activity of vasicine against the lungs damage in rats; 2, Indian.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, November 2024

[20]. Webpage: Essential Medicines and Health Products Information Portal- A World Health Organization resource: cited through http://apps.who.int/medicinedocs/ en/d/Jh2945e/2.1.html#Jh2945e.2.1 dated on 26/11/2013

[21]. Anonymous: Review on Indian medicinal plants, Vol. I, Indian council of medical research, New Delhi 2004: 257.

[22]. Anonymous: The Wealth of India (Raw materials), Vol. I, revised ed. A, CSIR, New Delhi 2005: 76

[23]. Shabir A: A review on AdhatodavasicaNees- An important and high demanded medicinal plant. Indo American Journal of Pharm Research 2013: 3(3).

[24]. Anonymous: the Ayurvedic Pharmacopeia of India, Part-1, Vol-1, Dept. of Ayush, Ministry of health & family welfare, New Delhi 2004; 173-74.

[25]. Anonymous: Review on Indian medicinal plants, Vol I, Indian council of medical research, New Delhi 2004: 258.

[26]. Anonymous: The Ayurvedic Pharmacopeia of India, part I, vol I, Dept. of Ayush, Ministry of health & family welfare, New Delhi 2004: 173-74

[27]. Sharngadhar: Sarngadhar Samhita, Madhya-khanda, 1/34, Shailaja S. editor, ChaukhambhaOrientalia, Varanasi 2011; 133.

[28]. Anonymous: The Ayurvedic Pharmacopeia of India, part II Vol- I, Dept. of Ayush, Ministry of health & family welfare, New Delhi 2004; 11: 46-48

[29]. Anonymous: The Ayurvedic Formulary of India, Part 1, Dept. of Ayush, Ministry of health & family welfare, New Delhi, 2003:92

[30]. Anonymous: Review on Indian medicinal plants, Indian council of medical research, New Delhi 2004: 1: 259.

[31]. Gupta OP, Anand KK, Ray Ghatak BJ and Atal CK: Vasicine, an alkaloid of Adhatodavasica, a promising uterotonic abortifacient. Indian JExpBiol 1978; 16: 1075- 1077.

[32]. Chandokhe N, Gupta OP and Atal CK: Abortifacient activity of the alkaloid vasicine through the release of prostaglandins. J Steroid Biochem 1978; 9: 885. 14. Chandokhe N: Vasicine- the alkaloid of Adhatodavasica a novel abortifacient. Indian Drugs 1987; 24: 425-429.

[33]. Rao MNA, Krishnan S, Jain MP and Anand KK: Synthesis of vasicine and vasicinone derivatives for oxytoxic and bronchodilatory activity. Indian J Pharmaceutic Sci 1982; 44: 151-152.

[34]. Sethi N, Nath D, Shukla SC, Dayal R and Sinha N: Abortifacient activity of a medicinal plant Adhatodavasica in rats. Arogya J Health Sci 1987; 13: 99-101.

[35]. Bhatt BP and Panwar MS: Plants with fertility potential of Garhwal Himalayas. J Econ Bot Pl 1990; 1: 33-34.

[36]. Khan H. Medicinal plants in light history: Recognised therapeutic modality. J. Evid. Based Intergr. Med. 2014;19:216-219.Do10.1177/2156587214533346

[37]. Herbal Pharmacognosy: Kristian Leisegang, in Herbal Medicine in Andrology, 2021. Science direct. Com. Medicine and dentistry pharmacognosy.

[38]. Background to Pharmacognosy: T. O. Elufioye, S, Badal in Pharmacognosy, 2017.Science direct. Com. Medicine and dentistry pharmacognosy.

[39]. Semwal DK, Mishra SP, Chauhan A, Semwal RB. Adverse health effects of tobacco and role of Ay- urveda in their reduction. J Med Sci. 2015; 15:139-46.