

The significance of Sanskrit names of medicinal plants used in Ayurveda

Leif-Alexander Garbe^{1,2}, Kandace Baez^{1,3}, Vijay J. Tiwari⁴ and Fabien Schultz^{1,3*}

¹ Applied Chemistry, Department of Agriculture and Food Sciences, Neubrandenburg University of Applied Sciences, Neubrandenburg 17033, Germany

² ZELT – Center for Nutrition and Food Technology gGmbH, Neubrandenburg 17033, Germany

³ Ethnopharmacology & Zoopharmacognosy Junior Research Group, Bernhard Nocht Institute for Tropical Medicine, Hamburg 20359, Germany

⁴ J. M. Patel College of Arts, Commerce and Science, Bhandara 441904 MS, India

* Corresponding author, E-mail: Fabien.Schultz@bnitm.de

Abstract

In ancient India, seers, sages, and Ayurveda practitioners would name traditional medicinal plants based on their pharmacological activity and scientific observations using Sanskrit, one of the oldest and most sacred languages of the world. In the present study, 23 medicinal plants used in Ayurveda have been analyzed to decipher the real meaning of each Sanskrit name by breaking down each name into its root word(s). The Sanskrit names of each medicinal Ayurveda plant have been cross-checked using a Sanskrit-English dictionary and five other online Sanskrit dictionaries. Each plant species was then placed in one of four categories based on their pharmacological activity. Translating and analyzing the Sanskrit names and relating them to their meaning in modern English, as well to pharmacological reports published on the respective medicinal plants, led to a number of results for each of the 23 species. After carefully analyzing the Sanskrit names, it was concluded that the ancient Indian seers, sages, and Ayurveda practitioners accurately named these 23 medicinal plants based on their bioactive compounds and pharmacological properties. However, further phytochemical and pharmacological investigations are necessary to confirm the uses mentioned within the Sanskrit names of plants.

Citation: Garbe LA, Baez K, Tiwari VJ, Schultz F. 2024. The significance of Sanskrit names of medicinal plants used in Ayurveda. *Medicinal Plant Biology* 3: e028 <https://doi.org/10.48130/mpb-0024-0024>

Introduction

Sanskrit is among the most ancient languages of the world. Dating back to roughly 5,000 B.C., this Indio-European language has been considered philosophical and sacred as it has been used throughout Hindu, Buddhist, and Jain scriptures. Indian seers, sages, and practitioners of Ayurveda, that practiced traditional medicine in India, meaningfully gave specific names to medicinal plants based on their pharmacological activity and scientific observations using the Sanskrit language. In the present study, the authors have attempted to decipher the real meaning of Sanskrit names by breaking down each Sanskrit name into its root word(s). The critical examination of these names and their derivation proves an interesting study for those captivated by history and linguistics.

In the Sanskrit language, the characterization of medicinal plants based on etymological derivation of names and synonyms is known as *namarupajnanam*. Acquaintance with names (*nama*), characters (*rupa*), and knowledge (*janam*) births a very important element for the identification of plants and reminds us of its recognition by the ancient seers and sages. The names which are still unknown or used in various regions of the world in different ancient languages and cultures should be investigated to discover their hidden meanings. This is extremely important to understand the names of Sanskrit medicinal plants since around 40% of pharmaceutical products today reflect nature and traditional knowledge^[1]. By understanding the reasoning behind the naming of select medicinal

plants, you can then apply that knowledge elsewhere and begin better analyzing and understanding the world around us through recognizing covert linguistics, symbolism, and rationalization hidden in plain sight. Sharma^[2], an Indian historian and Indologist, wrote a book on *namarupajnanam* in which he describes the characterization of medicinal plants based on the etymological derivation of names and synonyms. Similarly, Singh^[3] has pointed out loopholes in Sanskrit synonyms of Indian medicinal plants. Sensarma^[4] ascertained the botanical identity of many plants described in Sanskrit literature. Salve & Mishra^[5] have identified the plants used in *Madhava Cikitsa* for the treatment of diarrhea in Sanskrit language. Madhava is regarded as a seventh-century Indian physician who composed two treatises in Sanskrit on Ayurveda: The *Madhava Nidana* and the *Madhava Cikitsa*. Thomas et al.^[6] captured information from 200 texts, namely six *samhitas* (text treated according to euphonic rules), 57 *Nighantus* (Ayurveda pharmacopeia), and 140 *vyakhyas* (explanations) written in Sanskrit verse. They discovered that controversy existed within the correct botanical identification of medicinal plants since multiple Sanskrit names were assigned to a particular plant. Tiwari & Ittadwar^[7] approached Sanskrit names of certain Indian medicinal plants through a philological lens to establish the authenticity of the original names to properly determine the meaning of the plant names.

The present work has been undertaken by the authors because literature surveying reveals that there are very few reports available on assessing the validity of Sanskrit names of

plants. Additionally, it is very important to recognize that Sanskrit names are more than just language labels; they actually represent coded generational wisdom and heritage that can be used to further understand medicinal knowledge while also preserving the knowledge through the Sanskrit name. The present study may reveal novel uses of plants not described in the Sanskrit Verse of Ayurveda.

Methodology

The following Sanskrit names were taken from Nighantu, a Sanskrit term referring to a thematically categorized collection of words, revised by Kamat & Kamat^[8], Leucas^[9], and web pages from www.efloraofindia.com^[10]. These popular names have been carefully selected by the authors because they provide important clues to pharmacological activities of plants. Additionally, the meaning of these names were cross-checked by the authors through a Sanskrit-English dictionary by Apte^[11] and online Sanskrit dictionaries: www.learnsanskrit.cc; www.wisdomlib.org; www.wikitionary.org; www.hindwi.org; and sanskritdictionary.org. The authors have sampled recent pharmacological reports of plants to check the validity of their medicinal uses mentioned within the names of the plants. All plant names have been cross-checked for correctness by the Kew Medicinal Plant Names Services (MPNS, <https://mpns.science.kew.org>). Plant family assignments were done in accordance with The Angiosperm Phylogeny Group IV guidance^[12]. The data was then compiled in tabulated form.

It must be acknowledged that Sanskrit names of plant species used as medicine in Ayurveda become conflicted due to: 1) one plant entity may have many other names; and 2) many plant entities have only one name. Therefore, when constructing this mini-review, only meaningful names were selected that indicated new pharmacological properties. This method was adopted to divert from any distractions from our main focus which concentrates on reporting new medicinal uses of Sanskrit plant names. For select plants in Table 1, commonly known Sanskrit synonyms for plants 4, 5, 11, 13, 18, 22, and 23 were included. However, these other names were only added for the reader's reference, and including the breakdown of their Sanskrit literary meanings were not part of the scope of this project since they do not possess literary relevance.

Results

Table 1 displays summarized data from the existing literature on plants and their Sanskrit meanings.

Discussion

This discussion is focused on validating the use of Sanskrit named Ayurvedic medicinal plants while also presenting an analysis of Sanskrit names that indicate pharmacological activity.

For the purpose of further discussion, the species have been categorized into the following types:

Category 1: Plants in which relevant pharmacological findings are not yet reported.

Category 2: Plants in which relevant pharmacological findings support the uses mentioned within the names.

Category 3: Plants in which active phytochemicals are reported and show relevant pharmacological activity.

Category 4: Plants in which pharmacological activity reported, chemical characterization, and status as local commercial, standardized and licensed plant-based drug provide a strong rationale for the uses mentioned within the Sanskrit plant name.

In category 1, there are three plant species: *Luffa echinata* (used as an antitoxic), *Cynodon dactylon* (used for improvement of virility/semen promoting activities), and *Juniperus communis* var. *saxatilis* (used as an antidote to remove poison from the body). There is no pharmacological activity reported for these species.

Category 2 contains 20 plants that show corroboration with reported pharmacological activity: *Achyranthus aspera*, *Alpinia galanga*, *Baliospermum solanifolium*, *Berberis aristata*, *Carum carvi*, *Cassia angustifolia*, *Catunaregam spinosa*, *Centipeda minima*, *Croton tiglium*, *Datura metel*, *Euphorbia nerifolia*, *Hellenia speciosa*, *Lepidium sativum*, *Leptadenia reticulata*, *Mangifera indica*, *Paederia foetida*, *Pueraria tuberosa*, *Sapindus emarginatus*, *Terminalia chebula*, and *Tinospora cordifolia*. *Achyranthus aspera* is a popular medicinal plant that is used extensively in the treatment of a variety of medical conditions. *Tinospora cordifolia* is a versatile medicinal plant. The literary meaning of its name indicates that this plant keeps an individual free from pain, agony, and misery while also making them strong and energetic to help fight disease. Upadhyay et al.^[39] reported that this plant is used as a rejuvenating tonic to cure many diseases, thus the Sanskrit terms within its name appear valid. *Alpinia galanga* is used for laryngitis and oral cavity diseases. Its use is supported by various reports of antimicrobial and anti-inflammatory activity documented by Rao et al.^[14] and Subash et al.^[16]. *Hellenia speciosa* is used as an anti-leprosy medicine which has been shown to contain antibacterial activity reported by Malabadi^[29] and Roy et al.^[30]. *Lepidium sativum* is used to fight against various skin diseases and is associated with antibacterial and antifungal activities^[31] [1]. *Leptadenia reticulata* is used for improving good health, which in turn extends one's life span. Similarly, *Paederia foetida* contains antioxidants and nutritional value, also improving health. These two species reflect nutraceutical properties, indicating that these plants may provide prevention against chronic diseases, and are authenticated by reports from Naik & Acharya^[33] and Upadhyaya^[36] regarding their nutraceutical properties. *Baliospermum montanum* and *Croton tiglium* are reported to have purgative properties and are documented by Rout et al.^[17], Cory^[24], and Pillai^[25]. Seeds from *Catunaregam spinosa*, commonly known as emetic nut, irritate the stomach and induce vomiting^[22]. *Datura metel* is known to contain narcotic, hallucinatory, and poisonous properties due to the presence of bioactive alkaloids^[26]. Singh et al.^[34] have reported aphrodisiac qualities of *Mangifera indica*, commonly known as the mango, which further verifies its use as an aphrodisiac candidate boosting virility in men. *Carum carvi* is used against acid belching and when needing to detoxify the body. These uses are attributed to seed oil which improves digestion and relieves stomach and intestine spasms, which has been reported by Rasooli & Allameh^[19].

The third category contains four plants: *Berberis aristata*, *Cassia angustifolia*, *Pueraria tuberosa*, and *Euphorbia nerifolia*. When isolating berberine alkaloids from *Berberis aristata*, it has

Table 1. Summary of plants, pharmacological reports, and their Sanskrit meanings.

Sr. No.	Botanical names	Plant family	References and page numbers	Sanskrit names and their literary meaning with references	Pharmacological reports
1	<i>Achyranthes aspera</i> L.	Amaranthaceae	Leucas ^[9] , p. 211	Apamarga meaning a side way or another way ^[11] . Plant is used as a promising way to rid many diseases Hatkanthmukh shodhani 1. Hat = injured ^[11] , p. 1361; 2. Kanth = Larynx (www.hindwi.org); 3. Mukh = oral cavity or mouth; 4. Shodhani = detoxifying agent ^[15] . cures infectious diseases of the mouth and larynx Nikhumba meaning purging ^[15]	Used for curing several diseases ^[13] Antibacterial activity reported against 10 different types of pathogenic bacteria ^[14] In carraegeenan-induced edema in pleurisy rats, anti-inflammatory activity has been reported ^[16] Seeds used as potent purgative ^[17]
2	<i>Alpinia galanga</i> (L.) Willd.	Zingiberaceae	Leucas ^[9] , p. 32		
3	<i>Baliospermum solanifolium</i> (Burm. f.) Suresh., syn., <i>B. montanum</i> (Willd.) Muell. Arg.	Euphorbiaceae	Leucas ^[9] , p. 202		
4	<i>Berberis aristata</i> DC.	Berberidaceae	Leucas ^[9] , p. 66	Pachampaca (also known as Daruharidra) 1. Pacham = Digestion; 2. Paca = Cooking ^[15] . improves digestive process	Berberine alkaloid may affect the digestive process as it is known to affect cardiovascular, metabolic, renal, and hepatic disorders ^[18]
5	<i>Carum carvi</i> L.	Apiaceae	Leucas ^[9] , p. 22	Udgarashodhana (also known as Jeera) 1. Udgara = belching ^[33] . 2. Shodhana = detoxifying agent ^[15] . relieves acid belching	Seed oil improves digestion and relieves spasms in the stomach and intestine ^[19]
6	<i>Senna alexandrina</i> var. <i>alexandrina</i>	Fabaceae	Leucas ^[9] , p. 246	Mrdurecani 1. Mrdu = soft; 2. Recani = soften hard stools ^[11] , p. 861	Sennosides and anthranoids are present which causes a laxative effect ^[20]
7	<i>Catunaregam spinosa</i> (Thunb.) Tirveng., syn. <i>Randia dumetorum</i> (Retz.) Poir.	Rubiaceae	Kamat & Kamat ^[8] , p. 62	Chardana meaning to vomit to empty stomach ^[21]	Commonly known as emetic nut. The seeds irritate the stomach which causes vomiting ^[22]
8	<i>Centipeda minima</i> (L.) A. Braun & Asch.	Asteraceae	Leucas ^[9] , p. 251	Chikkani, Chikka meaning sneezing ^[11] , p. 390	Used for treating allergic rhinitis ^[23]
9	<i>Croton tiglium</i> L.	Euphorbiaceae	Kamat & Kamat ^[8] , p. 86	Recakah meaning to evacuate bowel; purgative ^[11] , p. 861	Increases gut mobility and has violent purgative action ^[24,25]
10	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Leucas ^[9] , p. 192	Sahasravirya 1. Sahasra = thousand ^[11] , p. 1354; 2. Virya = semen, virility ^[15] . increases semen production by 1,000	Not reported
11	<i>Datura metel</i> L.	Solanaceae	Leucas ^[9] , p. 154	Mahamohini (also known as Dhatura) 1. Maha = great ^[15] . 2. Mohini = depriving senses and understanding ^[21]	Plant possesses narcotic, hallucinatory, and poisonous properties due to the presence of bioactive alkaloids ^[26]
12	<i>Euphorbia nerrifolia</i> L.	Euphorbiaceae	Kamat & Kamat ^[8] , p. 88	Sakhakanda 1. Sakha = branch ^[15] . 2. Kanda = a knot-like swelling ^[21]	Antimicrobial activity reported in a review paper ^[27]
13	<i>Hellenia speciosa</i> (J. Koenig) S.R. Dutta., syn., <i>Costus speciosus</i> (J. Koenig) Sm.	Costaceae	eFloraofIndia ^[10]	Kushta (also known as Kut) meaning leprosy ^[21]	Anti-inflammatory activity of dried extract and isolated nerrifolione and cycloartenol were evaluated ^[28] Hexane and methanol extracts of leaves and rhizomes show antibacterial activity against seven species of pathogenic bacteria ^[29] . Roy et al. ^[30] reported a flavonoid which shows antibacterial activity <i>in vitro</i>
14	<i>Juniperus communis</i> var. <i>saxatilis</i> Pall.	Cupressaceae	Leucas ^[9] , p. 34	Visaghni 1. Vish = poison; 2. Aghni = fire ^[21] It removes/eliminates "the fire of poison" from the body.	Not reported
15	<i>Lepidium sativum</i> L.	Brassicaceae	Leucas ^[9] , p. 29	Charmahantri 1. Charma = skin(Apte ^[11] , p. 375); 2. Hantri = to remove or destroy ^[21] removes skin disease	Antimicrobial and antifungal activities reported by Shama Adam et al. ^[31] and Haj Bloukh et al. ^[32]

(to be continued)

Table 1. (continued)

Sr. No.	Botanical names	Plant family	References and page numbers	Sanskrit names and their literary meaning with references	Pharmacological reports
16	<i>Leptadenia reticulata</i> (Retz.) Wight & Arn.	Apocynaceae	Leucas ^[9] , p. 142	Jivanti = alive; Jivanti = vivifying ^[15] , Jiva = soul ^[21] improves life span and health	Naik & Acharya ^[33] reported this plant as nutritious, having high protein content and fat energy value with phosphorous and vitamin A. Not reported
17	<i>Luffa echinata</i> Roxb.	Cucurbitaceae	Leucas ^[9] , p. 247	Garanasani 1. Gara = a factitious poison; 2. Nashini = to remove, destroy ^[21] Destroys poison in the body	
18	<i>Mangifera indica</i> L. x	Anacardiaceae	Leucas ^[9] , p. 326	Kamanga (also known as Aam) meaning sexual desire ^[21]	Singh et al. ^[34] reported aphrodisiac potential
19	<i>Paederia foetida</i> L.	Rubiaceae	Leucas ^[9] , p. 218	Bala meaning energetic ^[11] , p. 709	Antioxidant and nutritional value was reported by Osman et al. ^[35] and Upadhyaya ^[36]
20	<i>Pueraria tuberosa</i> (Roxb. ex Willd.) DC.	Fabaceae	eFloraofIndia ^[10]	Vidari meaning a swelling of the groin ^[21]	isoorientin, and the anti-inflammatory active mechanism, was isolated and elucidated by Anilkumar et al. ^[37]
21	<i>Sapindus emarginatus</i> Vahl	Sapindaceae	Leucas ^[9] , p. 305	Garbhatana meaning induces abortion 1. Garbha = fetus in the womb 2. Patana = falling down (www.sanskritdictionary.org)	Cytotoxic activity reported by Kumar & Kavmani ^[40]
22	<i>Terminalia chebula</i> Retz.	Combretaceae	Leucas ^[9] , p. 3	Vayastha (also known as Haritaki, Harad, Abhaya, Pathya) meaning looking young in the prime of life between ages 16–17 ^[21] ;	Methanolic and aqueous extracts showed anti-aging effects ^[39]
23	<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thomson	Menispermaceae	Kamat & Kamat ^[8] , p. 2	delays aging process and acts as a rejuvenator Visalya (also known as Guduchi, Giloy, Amrutha) meaning free from pain, agony, and misery; Dhira meaning strong and energetic ^[21] ;	Used as a rejuvenator tonic; claimed to cure several diseases ^[40]

been shown to affect cardiovascular, metabolic, renal, and hepatic disorders^[18], which may help to improve digestion. Sennosides and anthranoids, when isolated from *Cassia angustifolia*, display laxative effects as reported by Aronson^[20]. Isoorientin, when isolated from the tubers of *Pueraria tuberosa*, shows anti-inflammatory properties^[37] and may be predicted to reduce inflammation in the groin. *Euphorbia nerrifolia* is used for healing knot-like swellings in the body which is corroborated with the antimicrobial and anti-inflammatory activities reported by Sultana et al.^[27] and Ilyas et al.^[28]. *Hellenia speciosa* is used as an anti-leprosy medicine and *Lepidium sativum* is similarly used to treat a variety of skin diseases. These uses can be corroborated by antibacterial activity reported by Malabadi^[29] and Roy et al.^[30]. Pharmacological investigations of *Sapindus emarginatus* indicate this plant as having cytotoxic properties^[40] which may act as supporting evidence for its abortifacient use. *Terminalia chebula* is used as a tonic for retaining a youthful appearance between the ages of 16 and 17. Its methanolic and aqueous extract shows anti-aging effects and has been substantially reported by Manosroi et al.^[38].

The fourth category includes just one plant species: *Centipeda minima*. This plant has been well documented as being used as a sneeze-inducing herb, curing allergic rhinitis.

Additionally, it must be addressed that we specifically looked at the linguistics of and analyzed the meaning of the Sanskrit names, rather than focusing on traditional medicine as a whole. This draws limitations to our study since we are only looking at linguistic break downs of each Sanskrit medicinal plant name. Since the present study was a mini-review, the study was limited to the analysis of the use of medicinal plants based on their Sanskrit name.

Conclusions

The study of Sanskrit names of plants is a deep learning process through understanding the philology and etymology of names of plants, along with conducting rigorous literature surveying. The present study explores the hidden meaning of Sanskrit names of traditional Indian medicinal plants and justifies their uses in Ayurveda and traditional systems of medicine. Possible rationales for Sanskrit names of plants are offered in the present study through an analysis of the pharmacological activity of each plant species. The present findings reveal that bioactive compounds are present in these plants and display relevant pharmacological properties. It appears that these pharmacological properties were acknowledged and used by the ancient Indian seers, sages, and Ayurveda practitioners when they were assigning valid Sanskrit names to these plants. However, additional phytochemical and pharmacological investigations are necessary to further confirm the uses mentioned within the Sanskrit names of plants.

Author contributions

The authors confirm contribution to the paper as follows: draft manuscript preparation: Garbe LA, Tiwari VJ,

Significance of medicinal plant names in Sanskrit

Baez K, Schultz F; study direction: Schultz F. All authors reviewed the results and approved the final version of the manuscript.

Data availability

All data generated during this study are included in this published article.

Acknowledgments

This work was supported by a grant from the Volkswagen Foundation (9E510; K.B. and F.S.).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Dates

Received 3 June 2024; Revised 6 September 2024; Accepted 18 September 2024; Published online 20 December 2024

References

- World Health Organization. 2024. *Traditional Medicine has a long history of contributing to conventional medicine and continues to hold promise*. www.who.int/news-room/feature-stories/detail/traditional-medicine-has-a-long-history-of-contributing-to-conventional-medicine-and-continues-to-hold-promise
- Sharma PV. 1920. *Namarupajnanam (Characterization of Medicinal Plants Based on Etymological Derivation of Names and Synonyms)*. Satyapriya Prakashan Varanasi, India
- Singh RS. 1969. Loopholes in Sanskrit synonyms of Indian medicinal plants. *Quarterly Journal of Crude Drug Research* 9:1327–33
- Sensarma P. 1992. Plant names - Sanskrit and Latin. *Ancient Science of Life* 12:201–20
- Salve NR, Mishra D. 2016. Botanical identification of plants described in Mādhava Cikitsā for the treatment of diarrhoea. *Ancient Science of Life* 35(4):195–200
- Thomas V, Venugopalan Nair SN, Ved DK, Shankar D. 2020. Controversial identities of medicinal plants in classical literature of Ayurveda. *Journal of Ayurveda and Integrative Medicine* 11(4):565–72
- Tiwari VJ, Ittadwar A. 2023. Philological study of Sanskrit names of Medicinal plants. *Research Journal of Pharmacognosy and Phytochemistry* 15(1):91–95
- Kamat S, Kamat D. 2002. *Studies on medicinal plants & drugs in Dhanvantari-Nighantu*. Chaukhamba Sanskrit Pratishthan. Vol. 37.
- Leucas DS. 2017. *Bhavprakasa Nighantu (Indian Materia Medica)*. Varanasi, India: Chaukhambha Visvabharati.
- eFloraofIndia. 2020. *Eflora of India*. www.efloraofindia.com (Accessed 14 March 2023)
- Apte VS. 1997. *Sanskrit-Hindi Kosh*. Delhi, India: Motilal and Banarsidass Publishers. pp. 62, 375, 709, 390, 861, 1361.
- The Angiosperm Phylogeny Group, Chase MW, Christenhusz MJM, Fay MF, Byng JW, Judd WS, et al. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society* 181(1):1–20
- He X, Wang X, Fang J, Chang Y, Ning N, et al. 2017. The genus *Achyranthes*: a review on traditional uses, phytochemistry, and pharmacological activities. *Journal of Ethnopharmacology* 203:260–78
- Rao K, Ch B, Narasu LM, Giri A. 2010. Antibacterial activity of *Alpinia galanga* (L.) willd crude extracts. *Applied Biochemistry and Biotechnology* 162:871–84
- Sanskrit L. 2017. *Learn Sanskrit*. www.learnsanskrit.cc (Accessed 16–17 March 2023)
- Subash KR, Bhanu G, Vijaya K, Manjunath K, Umamaheswara K. 2016. Anti-inflammatory activity of ethanolic extract of *Alpinia galanga* in carrageenan induced pleurisy rats. *National Journal of Physiology, Pharmacy and Pharmacology* 6(5):468
- Rout SP, Acharya R, Dash S. 2017. A critical review on danti (*Baliospermum montanum* willd.) with special reference to ayurvedic nighantus (lexicons). *European Journal of Biomedical* 4(4):348–53
- Neag MA, Mocan A, Echeverría J, Pop RM, Bocsan CI, et al. 2018. Berberine: botanical occurrence, traditional uses, extraction methods, and relevance in cardiovascular, metabolic, hepatic, and renal disorders. *Frontiers in Pharmacology* 9:577
- Rasooli I, Allameh A. 2016. Caraway (*Carum carvi* L.) essential oils. *Essential Oils in Food Preservation, Flavor and Safety*, ed. Preedy VR. Amsterdam: Elsevier. pp. 287–93. doi: 10.1016/b978-0-12-416641-7.00032-8
- Aronson JK. 2015. Fabaceae. In *Meyler's Side Effects of Drugs: The International Encyclopedia of Adverse Drug Reactions and Interactions*, ed. Aronson JK. 16th Edition. New York: Elsevier Science. pp. 229–36. doi: 10.1016/B978-0-444-53717-1.00723-X
- The Wisdom Library. 2023. *The Wisdom Library*. www.wisdomlib.org (Accessed on 15–17 March 2023)
- Garg AK, Chouhan P, Sharma B. 2019. Madanaphala (randia dumentorum): a pharmacological and pharmacognostical review. *International Journal of Recent Scientific Research* 10(4):32061–64
- Liang Y, Zhang X, Zou J, Shi Y, Wang Y, et al. 2019. Pharmacology mechanism of *Flos magnoliae* and *Centipeda minima* for treating allergic rhinitis based on pharmacology network. *Drug Development and Industrial Pharmacy* 45(9):1547–55
- Cory EA. 1833. Oil of *Croton tiglium* — on the oil of the croton tiglium as a purgative for children. *The Boston Medical and Surgical Journal* 9(13):202
- Pillai NR. 1999. Gastro intestinal effects of *Croton tiglium* in experimental animals. *Ancient Science of Life* 18(3&4):205–9
- Alam W, Khan H, Ali Khan S, Nazir S, Akkol EK. 2021. *Datura metel*: a review on chemical constituents, traditional uses and pharmacological activities. *Current Pharmaceutical Design* 27(22):2545–57
- Sultana A, Hossain MJ, Kuddus MR, Rashid MA, Zahan MS, et al. 2022. Ethnobotanical uses, phytochemistry, toxicology, and pharmacological properties of *Euphorbia neriifolia* Linn. against infectious diseases: a comprehensive review. *Molecules* 27(14):4374
- Ilyas M, et al. 2003. A novel triterpene (Neriifolione) a potent anti-inflammatory and antiarthritic agent from *Euphorbia neriifolia*. *Hamdard Medicus* 46(2):1–2 (Pakistan)
- Malabadi RB. 2005. Antibacterial activity in the rhizome extract of *Costus speciosus* (Koenig). *Journal of Phytological Research* 18:83–85
- Roy DS, De S, Maity S, Maity W, Das DC. 2019. Phytochemical screening, isolation of flavonoids from *Hellaenia speciosa* (J. Koenig) S. R Dutta and study of its antibacterial activity *in vitro*. *International Journal of Pharmacy and Biological Sciences* 3:641–47
- Shama Adam I, Salih SA, Abdelgadir WS. 2011. *In vitro* antimicrobial assessment of *Lepidium sativum* L. seeds extracts. *Asian Journal of Medical Sciences* 3(6):261–66
- Haj Bloukh S, Edis Z, Abu Sara H, Alhamaidah MA. 2021. Antimicrobial properties of *Lepidium sativum* L. facilitated silver nanoparticles. *Pharmaceutics* 13:1352
- Naik R, Acharya R. 2018. *Comparative nutritional evaluation of four botanical source plants of jivanti: a classical Ayurvedic drug*
- Singh R, Ali A, Gupta G, Semwal A, Jeyabalan G. 2013. Some medicinal plants with aphrodisiac potential: a current status. *Journal of Acute Disease* 2(3):179–88

35. Osman H, Rahim AA, Isa NM, Bakhir NM. 2009. Antioxidant activity and phenolic content of *Paederia foetida* and *Syzygium aqueum*. *Molecules* 14(3):970–78
36. Upadhyaya S. 2013. Screening of phytochemicals, nutritional status, antioxidant and antimicrobial activity of *Paederia foetida* Linn. from different localities of Assam, India. *Journal of Pharmacy Research* 7(1):139–41
37. Anilkumar K, Reddy GV, Azad R, Yarla NS, Dharmapuri G, et al. 2017. Evaluation of anti-inflammatory properties of isoorientin isolated from tubers of *Pueraria tuberosa*. *Oxidative Medicine and Cellular Longevity* 2017:5498054
38. Manosroi A, Jantrawut P, Akihisa T, Manosroi W, Manosroi J. 2010. *In vitro* anti-aging activities of *Terminalia chebulagall* extract. *Pharmaceutical Biology* 48(4):469–81
39. Upadhyay A, Kumar K, Kumar A, Mishra H. 2010. *Tinospora cordifolia* (Willd.) Hook. f. and Thoms.(Guduchi)–validation of the Ayurvedic pharmacology through experimental and clinical studies. *International Journal of Ayurveda Researc* 1(2):112–21
40. Vignesh Kumar S, Kavimani V. 2021. *Sapindus emarginatus* extract embedded with gold nanoparticles: an antiproliferative agent against MCF7 breast cancer cell line. *Characterization and Application of Nanomaterials* 4(2):1293



Copyright: © 2024 by the author(s). Published by Maximum Academic Press, Fayetteville, GA. This article is an open access article distributed under Creative Commons Attribution License (CC BY 4.0), visit <https://creativecommons.org/licenses/by/4.0/>.