International Journal of Chemical Science
www.chemicaljournals.com
Online ISSN: 2523-2843
Received: 09-02-2026, Accepted: 10-03-2026, Published: 26-03-2026
Volume 10, Issue 1, 2026, Page No. 57-60

A review on Phytopharmacological aspects of Aerva species

Pratyush Jaiswal[1], Dr. Namita Bhardwaj[2]
[1] Department of Chemistry, Dr. C V Raman University, Kota, Bilaspur, Chhattisgarh, India
[2] Professor, Department of Chemistry, Dr. C V Raman University, Kota, Bilaspur, Chhattisgarh, India

Abstract
Medicinal plants are a vital source of potentially beneficial novel molecules for the development of strong treatments for a lot of diseases. Many herbs have been proven to be effective against different kinds of diseases, but there is a shortage of such scientific evidence to support such claims. The goal of the current review is to clarify whether one of the plants which belong to the bone fracture healing category, the Aerva species contains high/rapid healing activity. Aerva species is a non-Indian origin plant that is widely distributed in India, also in Chhattisgarh. It possesses numerous medicinal benefits i.e., it is traditionally used for the treatment of wound healing, cough, diarrhea, ulcer, hyperglycemia, rheumatism, anticancer, antibacterial, and kidney problems. This medicinal activity is due to the presence of phytochemicals such as Flavonoids, tannins, alkaloids, saponins, cardiac glycosides, ascorbic acid, and phenolic compounds.

Keywords: Aerva species, Bone fracture, Cough, Diarrhea, Medicinal plants.

Introduction

In ancient literature for the treatment of different disorders, various herbs have been recommended. The literature lists approximately 28 species of the genus Aerva to identify the groups of plants that are widely utilized in the indigenous medical system as versatile/multipurpose agentslike Aerva javanica, Aerva lanata, etc [1].

The genus Aerva [Vernacular names: Telgu- Tella Burgaya, English- Kapok Bush, Hindi- Safedshamli/ Patharphori, Gujarati- safedshimlo, Marathi- Shamil, Bengali- Swetshimal, Kannada- Dudi, Tamil- Panchu] [2]. A penial, tall, woolly herb under shrub which is a member of the Amaranthaceae family can be found in great abundance during the rainy season [3].

This plant is commonly referred to as Pithauri bhaji in Chhattisgarh. According to reports, the roots and flowers have therapeutic benefits for treating renal and rheumatoid arthritis [4]. The properties of Aerva javanica include anthelmintic, diuretic, demulcent, and significantly used to cure headaches [5].

The herbal decocted extract of the plant is used for dysentery, gonorrhea, and cutaneous infectionas well as it is also administrated to remove swellings [6, 7]. Aerva javanica showed antioxidant [8], antiviral [9], anti-plasmodial [10], and antidiabetic activities [11].

The phytochemical analysis is necessary for the investigations of the roles of the herb in the medicinal field. The major chemical substances are alkaloids, steroids, saponins, phenols, and flavonoids these consist of many beneficial characteristics including antioxidant activity [12]. The Aerva species also consists of α-amyrin, β-sitosterol, aeranone, kaempferol, linoleic acid, myristic, n-acylated iso-rhamnetin glycoside, oleic acid, palmitic acid, palmitoleic acid, steric acid, sterol, steric acid, triterpenes, etc [13,14].

Review on phytochemicals study

- Muhammad samejo has used the dry distillation method [SD] and hydro distillation method [HD] to isolate oils from the leaves and stem of Aerva javanica plant and identified its chemical composition by Gas Chromatography-Mass Spectrometry (GC-MS). In contrast, the oil extracted fromleaves and stemwas found to be rich simultaneously in hentriacontane (21.48% -18.32%), nonacosane (20.59% - 23.26%), heptacosane (19.78% - 22.48%), octacosane (3.47% - 3.42%) and triacontane (2.81% - 2.24%) [15].
- Abdul wajid Khan has disclosed the existenceof derivatives of benzaldehyde, ursolic acid, and acryl amide by performing phytochemical analysis [16].
- Nabiel has extractednumerous common compounds such as new flavonol, isorhamnetingalactoside, kaempferol, quercetin, and isorhamnetin glycosides and its acylated derivative and its kaempferol analogfrom the plant Aerva javanica [14].
- Garg has isolated flavonoids, alkaloids, Chrysin-7-Ogalactosidem, etc from the plant Aerva persica [13].
- Emam has isolated several chemical components such asalkaloids, carbohydrates, flavonoids, glycosides, lipids, steroids, saponins, sulphates, tannins, triterpenes, from Aerva javanica [17].
- Musaddiq has isolated three novel acylated flavone glycosides from Aerva javanica's floral methanolic extract, which was chromatographically purification of ethyl acetate soluble fraction [18].
- Movaliya has provided a brand-new, affordable, and quick thin-layer chromatography method developed for an alcoholic extract of Aerva javanica's root. The smallest traceable quantity of quercetin was 0.02196% w/w [19].
- El-seedi has isolated Lupeol, betulinic acid, phytol, quercetin-3-O-rutinoside, and shikimic acid from the Aerva javanica [20].
- Abdel Wahab has analyzed the saponins in Aerva lanata and Aerva javanica and isolated three glycosides. Hydrolysis of glycosides gave various compounds such as glucose, galactose, rhamnose, lupeol, β-sitosterol, etc [21].
- Ammar has investigated the alkaloidal content in Aerva javanicaand Aerva lanata and disclosed the existence of Methyl aervin and Aervin in both the species, although

an indole alkaloid canthin-6-one was only found in Aerva lanata [22].

- Usmanghani has extracted numerous compounds and identified them as β-sitosterol glucoside, Hentriacontane, nonacosane, nonacosanol, tritriacontane, tetratriacontane, sitosterol, and oleanolic acidfrom Aerva javanica's leaves using ethyl acetate as extract [23].
- Aiyar has extracted some known glycosides of kaempferol from the entire part of Aerva javanica. Aerva lanata (the entire part) contains β-sitosteryl, palmitate, α-amyrin, and β-sitosterol [24].
- Shahim has used hydro distillation for the extraction of essential oil from desert cotton from growing flowers in the sandy soil of the UAE wild desert. They identified approximately 29 volatile components, while Augustine is the major one [25].
- Nawaz has used Hexane, Methanol, and Water as solvents and extracted flavonoids, saponins, tannins, cardiac glycosides, and ascorbic acid in each part of Aerva javanica. Also suggested that more polar solvents are comparatively better for the extraction of phytochemicals [26].
- Anand has used methanol, ethanol, and water as extracts and qualitatively analyzed steroids, reducing sugar, triterpenoids, alkaloids, phenolic compounds, flavonoids, cardiac glycosides, saponins, tannins, and anthraquinones in Aerva javanica [27].

Review on Pharmacological Study

- Chawla has identified that only a few species, including Aerva persica, Aerva lanata, and Aerva javanica, are utilized medicinally out of the around 28 species of the Aerva genus. It has been demonstrated that roots and flowers have hypoglycemic, antioxidant, anthelmintic, analgesic, antimalarial, antivenin, and therapeutic qualities for renal diseases and rheumatism [28].
- Kamil has analyzed the drug plant Aerva javanica and proven the anti-hyperglycemic activity, mild analgesic activity, and mild antidepressant activity. The plant drug showed gastro-protective activity in mice and tested for adaptogenic activity showed anti-stress activity and positive inotropic properties [29].
- Al-sheri has found the anti-cancerous effect of Aerva javanica methanol extract on breast cancer cell lines and prostate cancer cell line using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide. The antibacterial capacity of Aerva javanica solvent extracts was tested against Micrococcus luteus, Staphylococcus aureus, Pseudomonas aeruginosa, and Shigella flexneri [30].
- Boobalan has identified phytochemicals such as flavonoids, tannins, and phenolic compounds as abundant content in wild, *in vitro* leaf, and callus materials and were quantified by using HPLC technique. They have also performed antibacterial activity with comparatively analyzed between wild, *in vitro* regenerated leaf and callus. The fraction of secondary metabolites shows strong antibacterial activity against the selected human pathogens such as Staphylococcus aureus and Proteus vulgaris [31].
- Srinivas has used hexane, chloroform, and methanol as solvents and prepared crude extracts of different parts of Aerva javanica. There are numerous phytochemicals present in the methanolic extract of the flower and leaf, which shows increased antibacterial activity [32].
- Mufti hasused various solvents such as methanol, n-hexane, chloroform, ethyl acetate, and water as extracts for Aerva javanica and proved that these extracts have antibacterial and antifungal activity against various human pathogens [33].
- Aboutabl has qualitative and quantitatively analyzed various carbohydrates in the ethereal parts of Aerva lanata and Aerva javanica by applying PC, GLC, and gel filtration methods. In these species, various polysaccharides are found in various amounts. Polysaccharides proved of pectic nature and contained four and three fractions respectively in Aerva lanata and Aerva javanica using gel filtration on SephadexG-100. Aerva lanata polysaccharide exhibited higher hypoglycemic activity than Aerva javanica [34].

Miscellaneous Review

- Mohammad Saleem has used normal and reverse phase chromatography to separate four new ecdysteroidsand three known steroidsfrom the methanolic extract of the flowers of Aerva javanica. The ability of each of the four separate ecdysteroids to inhibit the enzymes acetylcholinesterase, butyryl-cholinesterase, and lipoxygenase was tested [35].
- Alloui has used solvents chloroform, ethyl acetate, n-butanol, and extracted flavonoids, saponins, tannins, alkaloids, and phenols from pedicel and petals of Aerva javanica. The ethyl acetate extracted contains higher phenolic content from stems, while chloroform extract contains the highest flavonoids. Chloroform extracts had an IC_{50} scavenging activity value of 0.1035 ± 0.03 gm/ml. The chemicals extracted from Aerva javanica showed positive antioxidant activity [36].
- Saleem has used UHPLC-MS and identified 45 phytochemicals in Aerva javanica and suggested that Aerva javanica could be further explored as a natural source of bioactive compounds [37].

Conclusion

Thus, it can be inferred that the current review is about the plant species Aerva, which is a member of the Amaranthaceae family and has a wide range of medicinal properties. According to literature reviews, roots and flowers can treat renal diseases and rheumatoid arthritis.

It is concluded that this plant possesses therapeutic potential in the treatment of 18 types of aliments, which are important phytochemical constituents and antioxidant activities that justify their therapeutic uses in traditional medicine.

Aerva javanica is a good contender as a natural herb to treat cancers, more so in breast cancer than in prostate cancer and it has the potential to work as an antimicrobial agent in multidrug-resistant microbes.

The phytochemicals extracted from Aerva javanica portray a positive antioxidant activity and could be further explored as a natural source of bioactive compounds. The oral administration of plant extract possesses potent anti-hyperglycemic activity, mild analgesic activity, and mild antidepressant activity were shown.

The Aerva species plant contains various phytochemicals in its Root, Leaves, Stem, and Flower part, which helps in fighting various medical conditions. In order to produce a poly-herbal formulation, there is therefore a good

opportunity to explore and describe active phytoconstituents, their mode of action, and the effective dose of plant extracts. Given the diverse phytochemical profile of Aerva species, there is a ton of room for further research in this area.

Acknowledgment
I would like to acknowledge and give my warmest thanks to my supervisor Dr. Namita Bhardwaj, who guide me to prepare this review paper. Her guidance and advice carried me through all the stages of writing my review paper.

References

1. Movaliya V, Zaveri M. A Review on the Pashanbheda Plant Aerva javanica. International Journal of Pharmaceutical Sciences Review and Research,2014:51:268-275.
2. Newman J, Gragg GM. Natural products as sources of new drugs over the last 25 years. Journal of Natural Products,2007:70:461.
3. Vaidya B. Some Controversial Drugs in Indian Medicine. 1st ed. Chaukhamba Orientalia,1982:3-8.
4. Gupta RK, Gaur YD, Malhotra SP, Dutta BK. Medicinal plants of the Indian arid zone. Journal of Agriculture Tropical & Botanical Application,1966:13:247-288.
5. Chopra RN, Nayar SL, Chopra IC. Glossary of Indian medicinal plants. New Delhi: Council of Scientific and Industrial Research,1956:4:8.
6. Garg SP, Bhushan R, Kapoor RC. Aervanone, a new flavanone from Aerva persica. Phytochemistry,1980:19:1265.
7. Kirtikar KR, Basu BD. Indian medicinal plants. Dehradun, India, International book distributors, booksellers and publishers,1996:3:2063-2068.
8. Singh R, Jain SC, Jain R. Antioxidant activity of some medicinally important arid zone plants. Asian Journal Experimental Science,2010:23:215-221.
9. Baltina LA, Flekhter OB, Nigmatullina LR, Boreko EI, Pavlova NI, Nikolaeva SN, *et al*. Lupane triterpenes and derivatives with antiviral activity. J Bioorganic Med Chem Lett,2003:13:3549-3552.
10. El-Hadi MA, Barki YMN, Yousif GM, Hassan SK. Anti-plasmodial activity of some medicinal plants used in Sudanese folk-medicine. Environ Health Insight,2010:4:1–6.
11. Srinivas KR, Reddy VM. Anti-hyperglycemic activity of ethanol extract of Aerva javanica leaves in alloxan-induced diabetic mice. Journal of Pharmacy Research,2009:2:1259-1261.
12. Alloui Z, Rahmani M, Dekmouche D, Djemoui D. Phytochemical Analysis and Antioxidant Activity of Aerva Javanica (Brum. F.) Juss. Ex Schult L. Journal of Fundamental and Applied Sciences,2023:12(1):12-25.
13. Garg SP, Bhushan R, Kapoor RC. Chrysin-7-O-galactoside: a new flavonoid from Aerva persica burm. F. Indian Journal of Chemistry, Section-B,1979:17(4):416-417.
14. Saleh NA, Mansour R, Markham KR. An acylated isorhamnetin glycoside from Aerva javanica. Phytochemistry,1990:29(4):1344-1345.
15. Samejo MQ, Memon S, Bhanger MI, Khan KM. Chemical compositions of the essential oil of Aerva javanica leaves and stems. Pakistan Journal of Analytical and Environmental Chemistry,2012:13(1):48-52.
16. Khan AW, Jain S, Parveen S, Khan RA, Saeed A, Tanveer AJ, *et al*. Phytochemical analysis and enzyme inhibition assay of Aerva javanica for ulcer. Chemistry Central Journal,2012:6(1):1-6.
17. Emam S. Phytochemical studies on the herb Aerva javanica growing in Egypt. Bulletin-Faculty of Agriculture University of Cairo,1999:50:488-515.
18. Musaddiq S, Riaz N, Saleem M, Ashraf M, Ismail T, Jabbar A. New acylated flavonoid glycosides from flowers of Aerva javanica. Journal of Asian Natural Products Research,2013:15(7):708-716.
19. Movaliya V, Zaveri MN. HPTLC method development and estimation of quercetin in the alcoholic extract of Aerva javanica root. Advance Research in Pharmaceuticals and Biologicals,2012:2(2):222-228.
20. El-Seedi HR, Sobaih SAM. Triterpenes and flavonol glycosides from Aerva javanica. RevistaLatinoamericana de Quimica,1999:27(1):17-21.
21. Abdel Wahab SM, Wassel GM, Aboutabl EA, Ammar NM, Afifi MS. Investigation of saponin content and lipoidal matter in two Aerva species growing in Egypt. Egyptian Journal of Pharmaceutical Sciences,1998:38(1-3):209-220.
22. Ammar N, El-Sayed NH, Tabl ESA, Wahab SA, Wassel G, Afifi M. Study of the alkaloidal contents of Aerva species, family Amaranthaceae, growing in Egypt. RevistaLatinoamericana de Quimica,1996:25(1):1-3.
23. Usmanghani K, Nazir T, Ahmad VU. Chemical constituents of Aerva javanica. Fitoterapia,1982:53(3):75-77.
24. Aiyar VN, Narayanan V, Seshadri TR, Vydeeswaran S. Chemical components of some Indian medicinal plants. Indian Journal of Chemistry,1973:11(1):89-90.
25. Shahin SM, Jaleel A, Alyafei MAM. Yield and *in vitro* antioxidant potential of essential oil from aervajavanica (Burm. F.) Juss Ex shult flower with special emphasis on seasonal changes. Plants,2021:10:2618.
26. Nawaz H, Shad MA, Andleeb H, Rehman T. Phytochemical and antioxidant composition of desert cotton (Aerva javanica) crude extracts in the solvent with varying polarity. International Journal of Pharmacy and Life Science,2015:6(2):4238-4246.
27. Anand SP, Doss A, Nandagopalan V. Qualitative and quantitative analysis of phytochemicals in aervajavanica (Burm. F.) shult. Acta Biomedica Scientia,2014:1(2):93-97.
28. Chawla P, Chawla A, Vasudeva N, Sharma SK. A review of chemistry and biological activities of the genus Aerva- a desert plant. Acta Poloniae Pharmaceutica,2012:69(2):171-177.
29. Kamil M, Ahmad F, Abdalla ElT. Anti-hyperglycemic activity and phytochemical studies of aervajavanica. Current Research in Diabetes & Obesity Journal,2021:14(3):1-7.
30. Al-sheri M, Moustafa M. Anticancer Antibacterial and phytochemicals derived from the extract of aervajavanica (Burm. F.) shult grown naturally in Saudi Arabia. Tropical Conservation Science,2019:12:1-10.
31. Boobalan S, Kamalanathan D. Spermidine influence enhanced micropropagation and antibacterial activity in

Aerva javanica (Burm. F.) shult. Elsevier,2019:137:187-196.
32. Srinivas P, Reddy S. Screening for antibacterial principle and activity of Aerva javanica (Burm. f) Juss. ex Schult. Asian Pacific Journal of Tropical Biomedicine,2012:2(2):838-845.
33. Mufti FUD, Ullah H, Bangash A, Khan N, Hussain S, Ullah F, *et al*. Antimicrobial activities of Aerva javanica and Paeonia emodi plants. Pakistan Journal Pharmaceutical Sciences,2012:25(3):565-569.
34. Aboutabl EA, Wassel GM, Abdel Wahab SM, Ammar NM, Yassin N, Afifi M. Study of different carbohydrates in Aerva lanata Juss ex Schult and A. javanica Burm. Fil. growing in Egypt and evaluation of the hypoglycemic effect of their polysaccharides. Egyptian Journal of Pharmaceutical Sciences,1998:38(1-3):33-42.
35. Saleem H, Zengin G, Khan KR, Ahmad I, Waqas M, Mahomoodally FM, *et al*. New insights into the phytochemical composition enzyme inhibition and antioxidant properties of desert cotton (aervajavanica (Burm. F.) shult.-Amaranthaceae). Natural Product Research,2019:35(4):664-668.
36. Alloui L, Rahamani Z, Dekmouche M, Djemoui D. Phytochemical analysis and antioxidant od aervajavanica(Burm. F.) Juss Ex shult. Journal of Fundamental and Applied Science,2021:12(1):12-25.
37. Saleem M, Musaddiq S, Riaz N, Zubair M, Ashraf M, Nasar R, *et al*. Ecdysteroids from the flowers of Aerva javanica. Steroids,2013:78(11):1098-1102.