WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 11, 211-218. Review Article ISSN 2277– 7105

ROLE OF EHRETIA LAEVIS ROXB IN WOUND HEALING ACTIVITY – A REVIEW

Achal V. Borkar*, Nilesh A. Karande and Lalit G. Rathi

Department of Quality Assurance, Institute of Pharmaceutical Education and Research Borgaon (Meghe) Wardha - 442 001, India.

Article Received on
29 July 2020,

Revised on 19 August 2020,
Accepted on 09 Sept. 2020,

DOI: 10.20959/wjpr202011-18617

***Corresponding Author**
Achal V. Borkar
Department of Quality Assurance, Institute of Pharmaceutical Education and Research Borgaon (Meghe) Wardha - 442 001, India.

ABSTRACT

The *Ehretia laevis* Roxb is a rare Indian medicinal plant and member of Boraginaceae family. The *Ehretia laevis* Roxb is high valued medicinal plant and becoming rare in the state of Maharashtra. It has a religious importance among Hindus. Many kind of *Ehretia* genus are termed as the anti-inflammatory, antidiabetic, and antibacterial activity. It is considered as small sapling due to its 12 m height. Plants are having more ability of biosynthesis of variety of organic compounds called as secondary metabolites, which are generally unique and more complex structures. Many secondary metabolites have been found to possess interesting pharmacological and therapeutic values and have applications such as pharmaceuticals, insecticides, dyes, colors, sweeteners, in cosmetics as flavors and fragrances. The treatments for various diseases are reported in Ayurvedic system of medicine. Medicinally important natural products are of immense use. In Wardha district of Maharashtra India, One such folk tribal herbal plant *Ehretia laevis* was found to be very effective in wound healing. All parts of this plant are used for different curative purposes.

KEYWORDS: Wound Healing activity, *Ehretia laevis* Roxb, Joint pain, Fracture, Khanduchakka.

1. INTRODUCTION

Plants are recognized in the pharmaceutical industry for their broad structural variety as well as their extensive range of pharmacological activities. The biologically active compounds present in plants are called phytochemicals. These phytochemicals are resulting from various fragments of plants such as leaves, flowers, seeds, barks, roots. These phytochemicals are

used as sources of direct medicinal agents.[1] Plants used for traditional medicine contain a wide range of active chemical constituents that can be used to treat acute, chronic and any infectious diseases.[2]

The *Ehretia laevis* Roxb is a rare Indian medicinal plant and member of Boraginaceae family is widely used medicinal plant. The *Ehretia laevis* Roxb is high valued medicinal plant and becoming rare in the state of Maharashtra. It has a spiritual importance among Hindus.[3] Indigenous name of this plant is Khanduchakka.[4] It has about 50 species.[5]

There are some wound healing problems like infections, old age, anxiety, diabetics, chemotherapy drugs, size, alcohol consumption, smoking, mal nourishment. Lots of higher exclusive antibiotics are used to treat wound infection. This is not affordable by rural population. Day by day resistances of higher antibiotics are increases in human. Patients have to face untoward effects of higher antibiotics.[6]

Many kinds of *Ehretia* genus are entitled for anti-inflammatory, antidiabetic, and antibacterial activity. [7] It is considered as small tree due to its 12 m height belonging to the family Boraginaceae.[8] The family Ehretiaceae is often treated as a subfamily of Boraginaceae by various authors.. It is generally found in Asia and Australian tropic.[9,10] It is a deciduous shrub. *Ehretia laevis* Roxb is one of such plants which being used in Indian traditional medicine for the cure of liver ailments. This beneficial plant has an irregular trunk with a light grey or whitish bark. Leaves are variable in size and shape. They vary from 2 cm to 6.3 cm in length and 1.3 cm to 3.8 cm in width. Flowers of these plants are white in colour. The calyx of these flowers are 2.5 mm long, 3-lobed and the corolla are 6-8 mm elongated, in which 5 corolla are lobed. The tube and lobes of corolla are longer than the calyx.[11]

In Wardha district of Maharashtra India, it would be one of the best options of crop cultivation for farmer in farmer suicidal area like Wardha. It was routinely employed by tribal for wound management with surprising output. Also used for minor fractures and joint pain and known as Khandu Chakka plant. All parts of this plant are used for different medicinal purposes.[12,13]

The plants of genus have significant medicinal importance and find uses in traditional medicine as a remedy for the treatment of diarrhea, cough, syphilis, toothache, stomach and

venereal diseases and as an antidote to vegetable poison parts of the *Ehretia laevis* plant are used for different medicinal purposes.[14]

The inner bark of *Ehretia laevis* Roxb is used as food. Leaves are applied to ulcers and in headache. Fruit is astringent, anthelmintic, diuretic, demulcent, expectorant and used in affections of urinary passages, infections of lungs and spleen. Decoction of the fresh root is used in the treatment of syphilis and that of the stem bark for the treatment of diphtheria. The paste of tender leaves is used externally to cure eczema, and the powder of flowers with milk is employed as an aphrodisiac. Powdered kernel mixed with oil is a therapy in ringworm. Seeds are anthelmintic.[15]

Fig. 1: *Ehretia laevis* Roxb (Khanduchakka Plant).

General Information

Botanical Name: *Ehretia laevis* Roxb.

Synonyms: *Ehretia laevis* Var. *platyphylla* Merrill.

Common/Local Name: Khanduchakka**.**

Regional and Other Names : Eng.: Ehretia; **Guj**.:vadhavaradi; **Hind**.:bhairi, chamror; **Nep**: datingal; **Konkan**.:kalo gamdo; **Mar**.: ajaanvruksha; **Tam**.:kuruviccai; **Tel**.:tellajuvvi; **Sanskrit:** charmavriksha.**[16]**

Plant Family: Boraginaceae (borage)

Habit and Habitat: Small deciduous tree, with short stem and grey bark, occasionally common.

Native: India, China, Bhutan, Pakistan, Laos, Myanmar.

Flowering and Fruiting Time: January to April

Flowers: White, up to 8 mm

Fruits: A small drupe, at first red, at length black.

Properties and Uses: the inner bark of *Ehretia laevis* Roxb is used as a food. Leaves are applied to ulcers and in headache. Fruits are astringent, anthelmintic, demulcent, expectorant, diuretic and used in affection of urinary passages, diseases of lungs and spleen. Powdered kernel mixed with oil is a remedy of ringworm. Seeds are anthelmintic.[17]

2. STEPS INVOLVED IN PLANT COLLECTION[1]

2.1. Collection of Plants

Plants under consideration can be collected either from wild forests or from herbariums. When plants are collected from wild, there is a risk that they have been incorrectly identified. The major advantage of wildlife plants is that they will not contain any pesticides. After the plants are collected from wild or from herbarium they have to be processed for cleaning in order to prevent the deterioration of phytochemicals present in plants.

2.2. Cleaning of Plants

After plants collection they have to be washed properly. The cleaning process may involve the following steps. Cleaning, washing, peeling or stripping leaves from stems. Cleaning has to be done by hands in order to get better results.

2.3. Drying

The main purpose of drying is to remove the water content from plants so that the plants can be stored. Plants have to be dried directly as soon as the plants collection or this will lead to damage of plant materials. The drying consists of two methods. Drying can be done either by natural procedure or by artificial method.

2.3.1. Natural Process

Natural process includes sun- drying. Sometimes plants are placed on drying frames or on stands, to be air-dried in barns or sheds. But this may take few weeks for complete drying. The time depends on temperature and humidity.

2.3.2. Artificial Drying

Artificial drying can be done with the help of artificial driers. This process will reduce the drying time to several hours or minutes. The common method that is followed in drying medicinal plants is warm-air drying. In this process plants are employed in the plates of drier on which warm air is blown. This method is mainly applicable to fragile flower and leaves and this requires large number of workers since loading and unloading of plants has to be done manually.

2.4. Powdering

After systematic drying of plants they have to be powdered well for further analysis.

3. METHODS OF EXTRACTION

3.1. Plant Tissue Homogenization

Plant tissue homogenization in solvent has been extensively used by researchers. Dried or wet, fresh plant parts are grinded in a blender to fine particles, put in a certain amount of solvent and shaken vigorously for 5 - 10 min or left for 24 h after which the extract is clarified. The filtrate then may be dried under reduced pressure and re-dissolved in the solvent to determine the concentration. Some researchers however centrifuged the filtrate for clarification of the extract.[18]

3.2. Serial Exhaustive Extraction

It is another common technique of extraction which involves sequential extraction with solvents of increasing polarity from a non-polar (hexane) to a more polar solvent (methanol) to ensure that a wide polarity range of compounds could be extracted. Various researchers employ soxhlet extraction of dried plant material using organic solvent. This technique cannot be used for thermolabile compounds as prolonged heating may lead to degradation of compounds.[18]

3.3. Soxhlet Extraction

Soxhlet extraction is only essential where the desired compound has a partial solubility in a solvent, and the impurity is insoluble in that solvent. If the desired compound has a great solubility in a solvent then a simple filtration can be used to separate the compound from the insoluble substance. The use of this system is that instead of many portions of warm solvent being passed through the sample, just one batch of solvent is recycled. This method cannot be

used for thermolabile compounds as sustained heating may lead to degradation of compounds.[19]

3.4. Maceration

In maceration (for fluid extract) method, entire or coarsely powdered plant- drug is kept in contact with the solvent in a stoppered vessel for a defined period with normal agitation until soluble matter is dissolved. This method is best suitable for use in case of the thermolabile drugs.[20]

3.5. Decoction

This method is used for the extraction of the water soluble and heat stable ingredients from crude drug by boiling it in water for 15 minutes, cooling, straining and passing adequate cold water through the drug to yield the required volume.[21]

3.6. Infusion

It is a dilute solution of the readily soluble components of the crude drugs. Fresh infusions are prepared by macerating the solids for a short period of time with either cold or boiling water.[21]

3.7. Digestion

This is a kind of maceration in which gentel heat is applied during the maceration extraction method. It is used when moderately elevated temperature is not objectionable and the solvent efficiency of the menstrum is increased thereby.[21]

3.8. Percolation

This technique used most frequently to extract active ingredients in the preparation of tinctures and fluid extracts. A percolator (a narrow, cone-shaped vessel open at both ends) is generally used.[22]

3.9. Sonication

This technique includes the use of ultrasound with frequencies ranging from 20 kHz to 2000 kHz; this increases the permeability of cell walls and creates cavitation.[22]

CONCLUSION

Plants of this genus as a native to India can become a great source of income for the nation. Hence it would be one of the best options of crop cultivation to farmer for financial support.

Also it is concluded that, this drug is very effective in wound healing and cheaper than surgical management.

In future extensive research to make the used this plant is more popular.

REFERENCES

1. Banu, K. Sahira, and L. Cathrine. General techniques involved in phytochemical analysis. International Journal of Advanced Research in Chemical Science, 2015; 2.4: 25-32.
2. Joshi, U. P., & Wagh, R. D., GC-MS Analysis of Phytochemical Compounds present in the bark extracts of *Ehretia laevis* Roxb. International Journal of Research and Development in Pharmacy & Life Sciences (IJRDPL), 2018; 7: 3150-3154.
3. Admuthe N. B., Nalwade A. R., Micropropagation for *Ehretia laevis* roxb.A rare Indian medicinal plant. International journal of advanceced scientific and technical research, 2016; 6(3): 411-422.
4. Karluke S.G., Efficacy of folklore plant khanduchakka (*Ehretia laevis* roxb) patra siddha tail in sandhivata. International Ayurvedic Medicinal Journal, 2017; 5(10).
5. Thakre, R., & Harne, K. Comparative Antimicrobial Study of Polar and Non Polar Extracts of *Ehretia Laevis* Roxb. (Khandu Chakka) Plant. Aayushi International Interdisciplinary Research Journal (AIIRJ), 2019; 10(6): 7-9.
6. Thakre R., Khobragade P., Harne K., Antimicrobial Activity of *Ehretia laevis* roxb. (khanduchakka) plant. World Journal of Pharmaceutical and Life sciences (WJPLS), 2018; 4(7): 112-116.
7. Shukla, A., & Kaur, A. A systematic review of traditional uses bioactive phytoconstituents of genus *Ehretia*. Asian Journal of Pcal and Clinical Research, 2018; 11(6): 88-100.
8. Rangnathrao, T. S., & Shanmugasundaram, D.P., Preliminary phytochemical screening and HPTLC method for qualitative determination of phytochemical compounds in extract of *Ehretia laevis* Roxb. J. Pharmacogn. Phytochem, 2018; 7(6): 867-874.
9. Kottaimuthu, R., A new name for Ehretia ovalifolia Wight (Ehretiaceae: Boraginales). Webbia, 2016; 71(2): 239-240.
10. Khobragade, P., Khobragade, M., & Nandgaonkar, P., Pharmacognostic and phytochemical studies on the leaves of Khanduchakka (*Ehretia laevis* Roxb)-A folklore plant. Journal of Indian System of Medicine, 2017; 5(2): 71.

11. Tarke S.R., Shanmugasundaram P., GC-MS analysis of ethanolic extracts of Ehretia laevis roxb. Journal Of Pharmacognosy And Phytochemistry, 2018; 7(6): 801-803.
12. Thakre R., Bhutada S., Chauragade B., Khobragade P., Harnr K., Ethano botanical properties of unexplored plant khandu chakka (*Ehretia laevis* roxb). International Journal of Ayurveda and Pharma Research, 2016; 4(7): 73.
13. Murarkar K.,Bande D., Chandak A., Antimicrobial activity and minimum inhibitory concentration of *Ehretia laevis* leaves extracts against different microorganisms. World Journal of Pharmaceutical Research, 2018; 7(12): 691-697.
14. Torane, R. C., Kamble, G. S., Kale, A. A., Gadkari, T. V., & Deshpande, N. R., Quantification of Dioctyl phthalate from *Ehretia laevis* Roxb by HPTLC. Journal of Chemical and Pharmaceutical Research, 2011; 3(3): 48-51.
15. Thakre R., Bhutada S., Chauragade B., Khobragade P., Harnr K., Ethano botanical properties of unexplored plant khandu chakka (*Ehretia laevis* roxb). International Journal of Ayurveda and Pharma Research, 2016; 4(7): 68-73.
16. Thakre, R., & Harne, K., Comparative Antimicrobial Study of Polar And Non Polar Extracts Of *Ehretia Laevis* Roxb. (Khandu Chakka) Plant. Aayushi International Interdisciplinary Research Journal (AIIRJ), 2019; 10(6): 7-9.
17. Admuthe N. B., Nalwade A. R., Micropropagation for *Ehretia laevis* roxb.A rare Indian medicinal plant. International journal of advanceced scientific and technical research, 2016; 6(3): 411-422.
18. Das, K., Tiwari, R. K. S., & Shrivastava, D. K., Techniques for evaluation of medicinal plant products as antimicrobial agents: current methods and future trends. Journal of medicinal plants research, 2010; 4(2): 104-111.
19. Nikhal, S. B., Dambe, P. A., Ghongade, D. B., & Goupale, D. C., Hydroalcoholic extraction of Mangifera indica (leaves) by Soxhletion. International Journal of Pharmaceutical Sciences, 2010; 2(1): 30-32.
20. Ncube, N. S., Afolayan, A. J., & Okoh, A. I., Assessment techniques of antimicrobial properties of natural compounds of plant origin: current methods and future trends. African journal of biotechnology, 2008; 7(12).
21. Remington JP. Remington: The science and practice of pharmacy, 21st edition, Lippincott Williams & Wilkins, 773-774.
22. Handa SS, Khanuja SPS, Longo G, Rakesh DD., Extraction Technologies for Medicinal and Aromatic Plants. International center for science and high technology, Trieste, 2008; 21-25.