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Review on Ajan vruksha/Khandu chakka Plant (Eheria Laveis Roxb.)

Rushikesh Kishor Jondhale, Somnath Bhima Khemnar, Aher Suraj Sahebrao
Guided By :- Shaikh N.M
Department of Pharamceutics ,Ashvin College of Pharmacy Manchi Hill,Tel-Sangmner, Ahmednagar- 413714.

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ABSTRACT:
Ehretia laevis roxb is an important medicinal plant in the pharmaceutical world due to the presence of its immense therapeutic properties. The plant is known for curing various disorders because of the presence of Benzoquinones- 1,4naphthoquinone lewisone, Bauerenol ,Bauerenol acetate, α-amyrin, Betulin, Lupeol, Betulinic acid, β-sitosterol,Dodecane, Tridecene , Tetradecane , n Octylcyclohexene, Amino acid- Butyric acid, Ornithine, Cysteine, HIstidine, Arginine, Serine, Glutamic acid, Lysine,Flavonoids,Glycosides,Cyanogenetic glycosides ,etc. The plant parts, inner bark,fruit,stems and leaves have been used since centuries in Ayurvedic medicines for curing a large number of diseases such as wound healing, fractures, UTI,headache, antihelminthics, diuretic, demulcent, expectorant, RTI(respiratory track infections) , fever, fungal infections, insecticidal, anti-inϑlammatory, anti-carcinogenic, weight gain, diabetes , muscles wasting, anti viral activity, preventing viral mutations, blood clotting, reduce the serum lipid level, immunity booster, promotes neural crest cell survival, sedation , anti-Alzheimer,anticoagulant, antiplatelet aggregatory, peptic ulcer, antiasthmatic, anti anticataract & ophthalmic effect, skin protective, nephroprotective, anti fatigue effect, protection of human sperm, protection of testicular tissue , antimalarial, cosmetics product, atopic dermatitis, anti fatigue, neuroprotective, retinoprotective, lung tissue protection, heart protection , prevention of splenocyte apoptosis, relieve stress and improve sleep, hepatic encephalopathy , anti-secretory, nerotransmitter, gulation, psychiatric disorders, collagen formation, reduce the recurrence, severity, healing period of herpes simplex virus infections, calcium absorption , muscle protein, post surgery recovery, sports injuries, hormones , aging, used in psychotropic drugs.

Keywords: Ajan vruksha,Khandu chakka ,Ehretia Laevis Roxb., Wound healing.

INTRODUCTION:

Ehretia laevis roxb is Semi-Evergreen tree , a medium size deciduous plant tree recoganised by its pale ,knobbly trunk and in season by losse white star shaped flowers,with maximum height 12 meter tall having dark green leaves . It also known as Ajan Vruksha /Dhatarang . The plant belonging to family Boraginaceae also known as the forget-me-not family . It approximately 150 species distributed . This herb is primarily dispersed all around tropical and sub tropical reigon of Asia,Africa,Australia,etc . This plant communly known as Dhatrang , Chamror , Harandi , Aadali , Paldattam , etc. The leaves ,fruit ,inner barks having lack of uses in ayurveda is communly used from acient times. It has been used in India as a part of the Ayurvedic medical system for the treatment of various ailments. In Ayurvedic medicines the leaves also used wound healing,joint pain ,fractures,skin infection, mouth blisters,eczema,cuts, wound, diabetics,and asthama . The fruit of these are also used as expectorant , astringent , anthelmintic , diuretic , demulcent ,infection of lungs and spleen.

Synonyms:
Khandu chakka,Ajan vruksha,Ehretia affinis wild, Ehertica indica ,etc.

Familiy:
The plant belonging to familiy Boraginaceae.

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Figure: Flowers of Ehertia Laevis Roxb.

Morphology:

Ehretia laevis is a medium sized tree reaching up to the height of 12 m . Its dropping branches bear dark green colored leaves with varied size 2–7.8 cm in length and 1.2 cm to 3.8 cm in width. The shape of leaves is obtuse; with 5 to 7 lateral veins on each side of the mid rib with a slender 2–3 cm long petiole. The bark of the plant is irregular and light grey. The flowers are white, with round orange fruits when ripe or mature.

Figure: Fruit of Ehertia Laevis Roxb.

Geographical Distrubutuion Of Ehertia Laevis :

E. laevis is mainly cultivated in India, China, Pakistan, Sri Lanka, Africa, Bhutan, Nepal, Brumha, Vietnam and Australia. The plant is mainly located in hilly forests and on hilly slopes

Phytochemical Constituents:

It has been a prevailing field of research for decades and several workers have explored this area due to its phytochemical properties. The various phytochemical compounds or secondary metabolites present it include :

Pentacyclic triterpenoids
Flavonoids
Tannins
Phenolic components
Alkaloids
Hydrocarbons
Aliphatic
Alcohol
Fatty acid
Ascorbic acids
Amino acids
Carbohydrates
Benzoquinones
Vitamins Minerals.

1.Pentacyclic Triterpenoids and Phytosterol:

Pentacyclic triterpenes are abundantly found in medicinal plants and they are synthesized in the cytosol from the cyclization of an epoxidized squalene which is a precursor of the diverse group of polycyclic triterpenes. Terpenes are derived from C_5 isoprene units, and based on the number of isoprene units, terpenes are classified according to the number of carbon atoms in the polycyclic chain (C_n) into; hemiterpenes (C_5) monoterpenes (C_{10}), sesquiterpenes (C_{15}), diterpenes (C_{20}), sesterterpenes (C_{25}), triterpenes (C_{30}) and tetraterpenes (C_{40}). Triterpenoids are either acyclic (only chains without rings or cycles) and pentacyclic (forming five rings or cycles). The pentacyclic triterpenes can be divided into three main classes, depending on the scaffold of their architecture, into; lupane (e.g., betulinic acid, betulin, lupeol) oleanane (e.g., β-amyrin) and ursane (e.g., α-amyrin, ursolic acid), etc. Presently, pentacyclic triterpenes have received much attention because of their versatile biological activities. Pentacyclic triterpenoids are the main active constituents present in its bark and leaves of E. laevis. Joshi and Wagh, reported a GC-MS analysis to isolate the triterpenoids such as lupane (**1**), olenane (**2**), ursane (**3**), betulinic acid (**4**), betulin (**5**), lupeol (**6**), ursolic acid (**7**) α-amyrin (**8**), β-amyrin (**9**), bauerenol (**10**), bauerenol acetate (**11**) and β-sitosterol (**12**) from petroleum ether, chloroform and methanolic extracts of its barks and leaves. The structures of most promising triterpenoids are present. These compounds display various pharmacological actions, and are generally devoid of major toxicity. Therefore, these triterpenes have become the promising leading

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compounds for the scientific community to design new multi-targeting bioactive agents .

2. Flavonoids:

Flavonoids are a group of natural products, which are present in plants (fruits, vegetables and also in certain beverages) . They are associated with various therapeutic activities and are present in a variety of medicinal, nutraceutical, pharmaceutical, and cosmetic preparations. The basic structures of these compounds are often characterized by a fifteen-carbon skeleton as a common phenyl benzopyrone linkage (C_6–C_3–C_6) in their structures. Flavonoids are a promising class of natural products sub-divided into flavonols (quercetin and kaempferol), flavones (luteolin and apigenin), flavanones (hesperetin and naringenin), flavan-3-ols (catechin and epicatechin) isoflavones (genistein), and flavanones .

3. Phenolic Acids and Tannins :

Plant phenolic acids are a fundamental human dietary component and are well renowned for their pharmacological actions such as antioxidant , anticancer , antiallergic , antimicrobial and anti-inflammatory properties . The antioxidant potential of a particular phenolic acid depends on the number of hydroxyl groups present as well as their position on the molecule. Tannins belong to the class of polyphenols. Tannins are water soluble compounds, are present in many plants and have the ability to precipitate proteins . Polyphenols are considered to be significant antioxidants and also act as therapeutic candidates in the mitigation of many diseases. Gallic acid and tannic acid are the main phenolic acids present in leaves and stem bark of this plant .

4.Vitamins:

Serval numbers of vitamins present in E.laeviswich help to development The trace elements in the leaves of E. laevis establish its nutritional value due to the presence of minerals and vitamins such as vitamins C, E, A, riboflavin and thiamine . Vitamin C plays a significant role in slowing the development and prevention of several diseases by exhibiting antioxidant action by scavenging free radicals and also acting as an enzyme cofactor in cells.

5.Minerals:

Minrals play an important role in body balance. Minerals are one of the essential and vital components of food and fodder. All the minerals play an important role in the structural and metabolic activities of the body, e.g., brain development, gastrointestinal tract (GIT) functions, bone development, bones and teeth strength.

Pharmacology :

There are number of uses in traditional system of medicine.we are mainly study about some few use which face regularly in day to day life . I.e. wound healing,analgesic,anti-inflamatory,antimicrobial, antioxidant, detal carries ,wound healing,etc. Some of them as follow:

Wound Healing:

A tribe of Wardha district of Maharashtra, India used E. laevis for the management of wound healing and found interesting results . In wardha district it use most communly .. Similarly in Rajasthan also recommended the paste prepared from leaves of plant for early healing of cuts and it show good result activity show on it .There are serval paper and activity perform show positive response and activity against wound healing.

Anti-inflammatory, Antiarthritic and Analgesic Activities:

The bark juice of the plant can also be used traditionally in obstetric practice for the relief of delivery pain.The plant has been recommended as an ethnic remedy for pain and inflammation. In the community of Amravati District, Maharashtra, the people also apply the root extract for the cure of inflammation. In early serval studies can studied that it use as antiarthritic and analgesic activity.

Antimicrobial Activity:

E. laevis has been employed as an ethnic medicine for the treatment of several infectious diseases, including those of viral, fungal, protozoal and bacterial origin. Several investigations have been performed in the recent past years to authenticate the antimicrobial potential of E. laevis.

Antioxident Activity:

Several studies suggest the antioxidant potential of plant E. laevis. Antioxidants are the substances which have capacity to inhibit or delay the oxidation process under the influence of either reactive oxygen species or environmental oxygen . Antioxidants are compounds which protect living organisms from damage caused by concomitant lipid peroxidation, protein damage; uncontrolled ROS production and breaking of the deoxyribonucleic acid (DNA) strand . In Ayurveda,

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there are many plants that possess antioxidant potential and can be used against diseases in which free radicals and ROS play an important role . Ethnomedical literature reports reveal that the plant. E. laevis contains compounds like ascorbic acid, phenolic acids, flavonoids, carotenoids and polyphenolic acids, which have the tendency to scavenge free radicals such as hydroperoxide, lipid peroxyl or peroxide and thus hamper oxidative stress that causes degenerative diseases. Various in vitro studies account for antioxidant potential of the plant E. laevis. The antioxidant effect of bark extracts.

Dental Caries

Dental caries is a foremost health trouble of oral cavity. Dental caries is initiated by the interaction of microbes on the tooth enamel . It is anticipated that about 2.3 billion inhabitants suffer from dental caries globally. According to the World Health Organization (WHO) the incidences of dental caries are constantly increasing. It affects all races, genders and age groups. The prevalence of caries is about 49% before the age of 12 years, while it progressively increases from 15 years (60%) and peaks at the age group of 60–74 (84%) . Salivary microflora is mainly accountable for dental caries. This salivary microflora contains cariogenic microorganisms which are involved in the process of caries formation and also perturb the normal microflora of oral cavity . An ethnomedicinal survey carried out by Patil and Patil, found that the tribe of Dhule district of Maharashtra used the stem of E. laevis as a brush for the cure of ulcers of mouth and gum problems . Similarly, another study reported that people living in remote areas of Rajasthan chewed the leaves of E. laevis to treat blisters of mouth . The remote areas of Pakistan also use this plant for the cure of dental caries It has also been documented that several parts of the plant were used for oral fitness . Young branches of E. laevis were also employed for the relief of toothache . Recently, Deshpande et al. investigated that the methanolic and ethanolic extracts of E. laevis inhibited the zone of inhibition towards salivary microflora at different concentrations (50, 100, 200, 400 and 800 µg/mL). It has been found that the methanolic extract at 100 µg/mL showed feeble antimicrobial action, whereas the zone of inhibition was increased up to 8.4 mm at 800 µg/mL . All these documented reports validate the traditional uses of E. laevis towards microbial diseases of oral tissues. A wide antimicrobial spectrum of E. laevis can be very helpful in the prevention of dental problems. Therefore, all these studies confirmed that E. laevis has the potential for the therapeutic management of oral/dental problems.

Toxology:

There are so many uses of these E.laevis was succesfuly use without any toxic or adverse effect.as per till there is no many adverse activity was happened about these. E.laevis was show activity antioxidant, analgesic, anti-inflammatory, antimicrobial, antiarthritic, and also used in several liver, skin, inflammatory, dysentery, infectious, and dental problems. None of the research groups approved any toxicity of the plant. At they end there is no toxic activity.

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