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Review Article

Evaluation of Mayeen Kalan (*Tamarix dioica*) through phytochemical, pharmacognostical, and pharmacological studies from an ethnomedicinal perspective in Unani medicine

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Abstract

Objective: This study seeks to provide an in-depth review and compilation of critical information regarding the botanical description, pharmacognostic characteristics, phytochemical constituents, pharmacological activities, and ethnomedicinal uses of Tamarix dioica, commonly known as Mayeen Kalan. The aim is to establish its significant therapeutic potential within the framework of Unani medicine.

Methods: We meticulously gathered data from esteemed classical Unani texts alongside contemporary scientific literature. This analysis encompassed botanical descriptions, traditional applications, and pharmacological investigations to highlight the plant's key therapeutic actions and pharmacological properties.

Results: *Tamarix dioica*, a prominent shrub from the Tamaricaceae family, is increasingly recognized in Unani medicine for its diverse benefits, including its Constipative (*Qabiz),* retentive (*Habis*), Anti-inflammatory, Astringent, Antifungal, Antibacterial, Hepatoprotective, and Antipyretic properties. Rigorous phytochemical screening revealed a wealth of active compounds, such as flavonoids, phenols, saponins, tannins, steroids, and terpenoids. Pharmacological studies provided compelling evidence of its antidiarrheal, hepatoprotective, antipyretic, antihyperlipidemic, and antimicrobial effects, showcasing significant dose-dependent outcomes that firmly support its traditional claims.

Conclusion: *Tamarix dioica* stands out as a powerful botanical with a remarkable array of pharmacological activities that validate its traditional uses in Unani medicine, particularly as an astringent and hepatoprotective agent. To harness its full potential, further clinical and toxicological studies are essential for developing safe and effective therapeutic formulations suitable for both modern and traditional medical practices. This research not only underscores the plant's historical importance but also paves the way for its integration into contemporary healthcare solutions.

Keywords: *Tamarix dioica*; *Mayeen Kalan*; traditional medicine; hepatoprotective; antidiarrheal; antimicrobial activity, *Aspergillus flavis, Microsporum canis*

Introduction:

The World Health Organization (WHO) reports that about one-third of the world's population relies on traditional medicine systems, mainly herbs, for their healthcare. Plants and herbs are among humanity's oldest companions. They are crucial not only for nutrition and shelter but also for treating various diseases. Traditional, herbal, and natural medicines have existed across different cultures and civilizations, including Chinese, Egyptian, Unani/Tibb (South Asian), Western (allopathic), Kampo (Japan), and Greco-Arab. Modern medicine has increasingly incorporated botanicals after scientific validation. Popular examples like garlic, ginger, ginseng, ginkgo, and ispaghula are gaining recognition among contemporary physicians. Additionally, research on the biological properties of medicinal plants and the impact of journals publishing this research is rapidly expanding [1]

Mayeen Kalan is a drug made from the Galls of *Tamarix dioica* Roxb, which belongs to the Tamaricaceae family. [2]

Tamarix dioica Roxb is a shrub or small tree that can grow up to 2 meters tall. Its branches droop, and its leaves are obliquely truncate and acuminate. The leaves are closely

adpressed and sheathed with a broad white margin. The flowers are pink or purple and grow in dense peduncle spikes. The capsule is oblong or conical. The fruit of Jhao, which is bigger and puffier than the small Mayeen, is also used to make this drug. It is triangular and shapeless and has a fragrant smell like Mazu.[3]

Sources:

It is found in river beds and near sea coasts in Tamil Nadu. The tree is native to Pakistan, Afghanistan, Iran, India, Bangladesh, Bhutan, Kashmir, Nepal, and Myanmar. It is abundant in Khyber Pakhtunkhwa (KPK) and Sindh provinces of Pakistan. *Tamarix dioica* is a perennial plant that can adapt to climate change, grow well in salty soil, and thrive in dry places.[4,5]

Description:

Microscopic:

Roots: The root system of *Tamarix dioica* is deep.

Stems: The stems are globous (smooth), reddish-brown, and heavily branching. The plant has two different kinds of branches: lignified, old-growing branches that are not deciduous and young, green, vegetative branches that are deciduous in the winter.

Leaves: Along the stem, the tiny, scale-like, greyish-green leaves overlay one another.

Flowers: Flowers from male and female plants grow on different plants. Racemes of pink or purple flowers, up to 8 cm long, make up the inflorescences.

Growth Habit: It is a tiny tree or shrub that can reach a maximum height of six meters.

Fruits: Capsule-shaped fruit of *Tamarix dioica* is specifically defined as trivalved and conic-pyramidal. Fruit Size: 3.5–5 mm is the length of the capsules.

Seed: The sessile coma (tuft of hairs) is 2.75-3 mm long, while the seeds themselves are tiny, about 0.5 mm long.

Medicinal Part: Bark, galls, twigs, leaves, fruit, and flowers[6]

Vernacular Names: [2,7,5,6]

Urdu: Mayeen Kalan,

Hindi: Jhau ,

Bengali: Lal-Jhau,

Gujarati: Jhav-nu-Jhad,

Punjabi: Pilchi, Maeen

Tamil: Shirushavakhu ,

Telugu: Erusarumanu,

Ayurvedic: Maachikaa.[2,7]

Sanskrit: Jhavuka, Machika[5,6]

Mijaz (Temperament): Cold & dry, [2,3,8]

Miqdare Khurak (Therapeutic Dose):3-5gm,7 masha [2,3]

Important Unani formulation: Hab-e-Pechish; Safoof-e-Sailanur-Reham; Safoof-e- Salab; Safoof-e-Habis-ud-dam, safoof-e-habb-ur-Rumman.[2,9]

Af'al (Action) in Unani classical literature: [2,3,10]

Qabiz(Constipative),Habis(Retentive), Rade(Derivative) , Mujaffif(desiccant), Jali (Detergent) , Mufatteh (deobstruent) , Muqawwi-e- Meda wa Jigar wa Tihal.

Therapeutic Uses in Unani Classical Literature:[2,3,10]

Lissa Damia (Bleeding Gums), Waja-ul-Asnan (Pain in teeth), Ishal (Diarrhea), Qulah (Stomatitis), Surat-e-Inzal (Premature Ejaculation), Riqqat-e-Mani (Attenuated semen), Zaheer (Dysentery), Sailan-ur-Reham (Leucorrhoea)

Chemical Compounds of Mayeen Kalan (*Tamarix dioica*) : The *Tamarix dioica* plant has been extensively analyzed for its phytochemical composition. Various compounds such as flavonoids, phenols, proteins, amino acids, saponins, tannins, terpenoids, and fixed oils have been identified in its aqueous extracts. Phytochemical screening of the plant revealed the presence of steroids and phlobatannins in all its parts, such as stems, flowers, leaves, and roots. Flowers, leaves, and roots were found to contain tannins, phenols, and flavonoids, while stems, flowers, and leaves were found to contain terpenoids and saponins. However, no proteins, alkaloids, glycosides, or amino acids were detected in any part of the plant. [4,11]

Pharmacological Activity:

Antidiarrheal Activity:

Imtiaz SM et.al. conducted a study where the methanolic extract of *T. dioica* had a significant antidiarrheal effect when orally administered at doses of 100.0, 200.0, and 400.0 mg/kg. It exhibited prominent inhibition of loose stools compared to the control group of 13.62% ($p < 0.05$), 45.0% ($p < 0.01$), and 60.62% ($p < 0.005$), respectively. The positive control, loperamide (3 mg/kg), caused a 74.1% ($p < 0.005$) inhibition, which was found to be the maximum. The control saline group (NS, 10 mL/kg) caused negligible inhibition of diarrhoea. [12]

Hepatoprotective activity:

Komal S. et. al conducted a study where the Extracts of *T. dioica*, especially the aqueous extract at a dose of 300mg/kg, have been found to reduce acute liver damage caused by CCl4. In an experimental model, this extract also improved histopathological and biochemical parameters and was non-toxic at a higher dose of 2000mg/kg/body weight in mice. These findings suggested that T. dioica has potential as a hepatoprotective drug. [13] Extracts of *Tamarix dioica* leaves at a dosage of 400mg/kg were shown to have the most hepatoprotective qualities and to prevent paracetamol-induced toxicity on serum biochemical parameters to the greatest extent. Maximum and analogous activity against paracetamol-induced hepatotoxicity was seen by the aqueous extract.[14]

Antipyretic activity:

Iqbal A et al. conducted a study on the antipyretic activity of *Tamarix dioica* of crude methanolic extract when

tested by Pyrexia induction with Brewer's yeast. Analysis of the data revealed that different doses of the crude extract showed significant Antipyretic activity.[15]

Anti-hyper-lipidemic activity:

Kalam Urfi M.et. al conducted a study where the Methanolic and phenolic extract of *Tamarix dioica* showed a dose-dependent decrease in the levels of cholesterol, triglyceride, LDL-C, and VLDL-C levels and increased HDL-C at the doses of 400 and 500 mg/kg body weight in triton X-100 induced hyper-lipidemic rats. Atorvastatin is used as a standard drug. Phenolic extract 500 mg/kg body weight has definite antihyperlipidemic activity.[16]

Antimicrobial activity:

Kalam Urfi M.et. al conducted a study that the *Tamarix dioica* extracts showed antibacterial properties against human pathogen strains, mean inhibition zone was from 0 to 6.5 mm when concentration increased from 2 to 100 mg/l. The strongest activity was shown against Micrococcus luteus and the lowest activity was against Escherichia coli.[16]

Anti-fungal activity:

Antifungal activity of crude extract of *T. dioica* leaves was studied. The extract was dissolved in Dimethyl Sulfoxide, then six strains of fungi were subjected to crude extract separately by agar tube dilution method. Inhibitory effect of extract in millimeters was determined. Crude extract possess significant activity against *A. flavis* and *M. canis* while moderate activity against F. solani.[17]

Conclusion:

Mayeen Kalan, a remarkable Unani medicine derived from the galls of the *Tamarix dioica* plant, boasts a rich history of therapeutic use. Esteemed for its diverse medicinal properties, it is particularly recognized for its Qabiz (constipative), Habis (retentive), and Mujaffif (desiccant) effects. Traditionally, this potent remedy has been employed to alleviate various ailments, including persistent diarrhea, bleeding gums, dysentery, and leucorrhea, providing relief to those in need.

The medicinal efficacy of *Mayeen Kalan* is underpinned by its impressive phytochemical composition, which includes a plethora of beneficial compounds such as flavonoids, phenols, tannins, saponins, and terpenoids. These natural constituents contribute to its effectiveness and are a testament to its rich botanical heritage.

In contemporary studies, modern pharmacological research has validated its impressive array of therapeutic activities, revealing antidiarrheal, hepatoprotective, antipyretic, antihyperlipidemic, and antimicrobial properties. This multifaceted pharmacological potential underscore the relevance of *Tamarix dioica* not only in the realm of Unani medicine but also as a candidate for further exploration in the search for safe, effective, and natural therapeutic agents in modern healthcare. Thus, it invites a deeper investigation into its application for developing innovative treatments that harness the power of nature.

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