Therapeutical and medicinal properties of Neem (Azadirachta indica) in context of Unani System of Medicine: A Review Study

*Haider Ali Quraishi1, Naquibul Islam2, Arsheed Iqbal3, Shabir Ahmad Bhat4, Jameel Ahmed5, Syed Sabahat Ashraf6, Qamar Alam Khan7

ABSTRACT

Neem is very important medicinal plant which is used to treat different diseases in Unani System of Medicine as well as traditional system of medicine (Ayurveda, Homeopathic Chines and European "Materia Medica"). The use of traditional medicine and medicinal plants in most developing countries, as a normative basis for the maintenance of good health, has been widely observed. In the last century, approximately 130 pharmaceutical products have been discovered based on the information obtained from the traditional scientist and physician. The importance of the Neem tree has been recognized by the US National Academy of Sciences, which publish a report in 1992 entitled 'Neem - a tree for solving global problems'. The scientific name of Neem, Azadirachta indica, is derived from the Persian, Azad means "Free" dirakht means "tree" I-Hindi means "of Indian Origin" Hence it literally means "the free tree of India". The Chemical principles from natural sources have become much simpler and have contributed significantly to the development of new drugs from medicinal plants and because of these facts the domain market for plant derived chemicals, pharmaceuticals, fragrances, flavor's, and color ingredients, alone exceeds several billion dollars per year. The present review highlights a Unani medicine literature as well as scientific on taxonomical, botanical, and pharmacological discussion on Neem.

Keywords: Neem, Azadirachta indica, Unani Medicine, Nim.

INTRODUCTION

Neem is a large found wild and often cultivated in India[1-8]. The height of the tree is about 12 meters to 15 meters. All the part of the tree is bitter in taste. Its stem is erect and having a girth of 1.75 meters to 2.75 meters with spreading branches. Bark is dark grey and rough[1].

Leaves are green in color, bluntly serrate and alternate. The flowers are white, having a scented odor especially at night. Its fruit is smooth, oblong and small in size and is called, Niboli. Unripe fruit is color and bitter in taste while the ripe fruit is yellow colored and somewhat sweetish in taste.[1,5] Its four varieties viz. Ban, Bakain (Maha neem), Bhoo neem, and Meetha neem (Kiphyapak) have been mentioned in classical literature[1].

Neem Gum

The bark exudes, a clear, bright, amber colored gum, known as the East Indian gum which blackens with age. It forms into small tears or vermiform pieces, and the surface is cracked or fissured. The tears are soluble in cold water and are non-bitter. The tears in the drier areas produce the gum very freely. In wet climate, the gum is liable to be washed away or spoiled before collection[7].
A. indica commonly known as neem, is a large, evergreen tree, 12-18m in height and 1.8-2.4m in girth, with a straight and long, spreading branches forming a board crown, commonly found throughout the greater part of India.

**BOTANICAL DESCRIPTION**

**Stem and Bark**

Stem has a girth 1.8-2.4m and the bark is rough, hard, grey or dark grey, reddish brown inside with numerous oblique furrows and scattered tubercles.

**Leaves**

The leaves are alternate, impair pinnate and 20-38 cm long. The leaflets are 8-19 cm alternate or opposite. Leaves are ovate-lanceolate, oblique or sub foliate, glossy and bluntly serrate.

**Flowers**

The flowers are hermaphrodite. White or pale yellow, small, scented and numerous. Flowers are very lax and in axillary panicles.

**Calyx**

The calyx is five lobe d. The sepals are small in size.

**Petals**

The petals are five in number, polypetalous. Stamina tube is a little shorter than the petals. There are 9-10 lobes at the apex; the lobes are truncate, again slightly toothed. The anthers are within the tube opposite to and shorter than the lobes.

**Ovary**

The ovary is called, style elongate, slender and stigma shortly cylindrical. There are two collateral ovules in each cell.

**Fruit**

The fruit is one seeded, drupe and endocarp is woody.

**Seeds**

The seeds are ellipsoid, cotyledons thick, fleshy cordate at base and radical superior.

**MIZAJ (Temperament)**

The Unani authors described its Mizaj as follows:

- **Har**\(^1\) Yabis\(^2\) [1, 6]
- **Har**\(^1\) Yabis\(^2\) [9]
- **Barid**\(^1\) Yabis\(^1\) [2, 5, 7]
- **Barid**\(^1\) Yabis\(^2\) [8]
- **Har**\(^2\) Rataab\(^2\) [14, 12]
**AFAAL (Pharmacological Actions)**

Various Pharmacological action described in Unani Classical literature are as follows,

**Dafe humma** (Antipyretic) [1,7]

**Dafe yarqaan** (Useful in Jaundice [1]

**Dafe taaffun** (Antiseptic) [1-7]

**Hazim** (Digestive) [1-3]

**Habise ishaal** (Antidiarrheal) [1,2,5]

**Kasire riyah** (Anti flatulent) [1-2,4-6]

**Munzij** (Concoctive) [1-8]

**Musakkine alam** (Analgesic) [1,2,5,6]

**Nafe amrazz jild** (Skin Diseases) [1-7]

**Mundamile Qurooh** (Cicatrizant) [1,2,5-7]

**Musakkine atash** (Thirst quenching) [1,2,5]

**Muqvavi snan wa lissa** (Teeth and gum tonic) [1-8,12]

**Muqvavi basar** (Eye tonic) [1,2,4]

**Musakkine suaal** (Antitussive) [1,2,5]

**Madire Haiz** (Emmenagogue) [1,2,5]

**Musakkine Suda** (Headache Reliever) [1-8,12]

**Mudire Haiz** (Antipyretic and Anti-inflammatory) [1-2,5]

**Munzij** (Teeth and gum tonic) [1-2,4-6]

**Nafe amrazz jild** (Skin Diseases) [1-7]

**Nafe amrazz jild** (Skin Diseases) [1-7]

**Nafe ziabetus** (Anti Diabetic) [11]

**Nafe zeegunnafas** (Useful in asthma) [1-2]

**Nafe jarooth wa qurooh** (Useful in burns and wounds) [1-3,5,7]

**Nafe falij and laqwa** (Useful in paralysis and hemiplegia) [1-2,5,6]

**Nafe istisqa** (Useful in Dryness) [1,2,5]

**Nafe wajaul mufasil** (Anti rheumatic) [1-3,5,6,8,12]

**Nafe darde gosh** (Useful in ear ache) [1-8,12]

**Rade** (Repellent) [3,8]

**AFAAL OF NEEM GUM**

Neem gum is mentioned as **Muqvavi (Tonic)**, **Muharrir (Stimulant)**, **Muzliq (Demulcent)** and **Mano-e-Nazla (Anti catarrhal)** [11]

**ETHNO BOTANY SURVEY**

Medicinal Uses

Almost every part of the tree has long been used in folklore and traditional systems of medicine for the treatment of a variety of human ailments, particularly against diseases of bacterial and fungal origin [10,11,13,14]. Nimbinid is anti-arthritis and anti-inflammatory [15] in its action and possesses significant antiulcer potential [16] whereas various other fraction have antipyretic and anti-inflammatory [17] and antitumor [18] properties. The extracts and various factors derived from neem also possess diverse biological effects on insects such as repellency, phagodeterrence, reduced growth, abnormal development and reduced oviposition. [19]. An antineoplastic drug has also been obtained from the bark of bark plant [20,21].

**ETHNO BOTANY SURVEY OF NEEM GUM**

Neem gum is mentioned as a tonic [22-24], Stimulant [22], demulcent [23, 24], blood purifier [24], Anti-catarrhal [23-25], remedy for splenic enlargement [14] and antipyretic [24].

**Table 2: Phytochemical Studies**

<table>
<thead>
<tr>
<th>Compounds</th>
<th>Source</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-alpha-acetoxy-4,4,8-trimethyl-5-alpha-(13-alphame)-androsta-1,14-dien-3,16-dione</td>
<td>Ripe fruit coat</td>
<td>[26]</td>
</tr>
<tr>
<td>7-alpha-acetoxy-4,4,8-trimethyl-5-alpha-(13-alphame)-oxandrosta-1,14-dien-3,16-dione</td>
<td>Ripe fruit coat</td>
<td>[26]</td>
</tr>
<tr>
<td>7-alpha-acetoxy-4,4,8-trimethyl-5-alpha-17-oxandrosta-1,14-dien-3,16-dione</td>
<td>Ripe fruit coat</td>
<td>[26]</td>
</tr>
<tr>
<td>Azadiracht</td>
<td>Fresh whole fruit</td>
<td>[26]</td>
</tr>
<tr>
<td>Azadirachta</td>
<td>Neem seed</td>
<td>[27]</td>
</tr>
<tr>
<td>Azadiradione</td>
<td>Neem oil</td>
<td>[28,29]</td>
</tr>
<tr>
<td>Azadirinine</td>
<td>Root bark</td>
<td>[30]</td>
</tr>
<tr>
<td>Azadirol</td>
<td>Ripe fruit</td>
<td>[31]</td>
</tr>
<tr>
<td>Azadiron</td>
<td>Neem oil</td>
<td>[28]</td>
</tr>
<tr>
<td>Deacetylumiminibin</td>
<td>Neem oil</td>
<td>[31,32]</td>
</tr>
<tr>
<td>Cis and trans-3,5-Diethyl-1,2,4-trithiolanes</td>
<td>Neem oil</td>
<td>[33]</td>
</tr>
<tr>
<td>6,8-Dihydroxy-3-methyl-1,3,4-hydro iso coumarin</td>
<td>Uncrushed twigs</td>
<td>[33]</td>
</tr>
<tr>
<td>7,8-Dihydroxy-3-methyl-3,A-dihydro iso coumarin (Margocetin)</td>
<td>Uncrushed twigs</td>
<td>[33]</td>
</tr>
<tr>
<td>6,8-Dimethoxy-7-hydroxy coumarin</td>
<td>Uncrushed twigs</td>
<td>[33]</td>
</tr>
<tr>
<td>Dimethylumiminibolin</td>
<td>Stem bark</td>
<td>[34]</td>
</tr>
<tr>
<td>Di-tri and tetrasulphide with di-n-propyl disulphide</td>
<td>Seed oil</td>
<td>[35]</td>
</tr>
<tr>
<td>Docosane</td>
<td>Leaves and fruit coat</td>
<td>[16,33]</td>
</tr>
<tr>
<td>Docosene</td>
<td>Fruit coat</td>
<td>[16]</td>
</tr>
<tr>
<td>Dotriacontane</td>
<td>Leaves</td>
<td>[33]</td>
</tr>
<tr>
<td>17-Epinimbocinol</td>
<td>Neem oil</td>
<td>[38]</td>
</tr>
<tr>
<td>Gedunin</td>
<td>Neem oil</td>
<td>[38]</td>
</tr>
<tr>
<td>Hentriacontane</td>
<td>Leaves</td>
<td>[33]</td>
</tr>
<tr>
<td>Hepcosane</td>
<td>Leaves</td>
<td>[26]</td>
</tr>
<tr>
<td>17, Hydroxyzadiradione</td>
<td>Neem oil</td>
<td>[29]</td>
</tr>
<tr>
<td>Icosane</td>
<td>Fruit coat</td>
<td>[31]</td>
</tr>
<tr>
<td>Kulactone</td>
<td>Ripe fruit</td>
<td>[37]</td>
</tr>
<tr>
<td>Limocin A</td>
<td>Ripe fruit coating</td>
<td>[37]</td>
</tr>
<tr>
<td>Limocin B</td>
<td>Ripe fruit coating</td>
<td>[37]</td>
</tr>
</tbody>
</table>
CHEMISTRY OF NEEM GUM

Analysis of gum gave moisture 13.8%, and ash 3.0%. Purification of gum with alcohol gave a non-reducing gum having $[\alpha]_{	ext{D}}$ 21.5$^\circ$ -70.6$^\circ$. On hydrolysis it yielded L-Arabinose, L-Fructose, D-Galactose and D-Glucouronic acid. The aldouronic acid component of the gum, obtained by graded hydrolysis, was found to be 4-0- (D-glucopyranosyl uronic acid) -D-galactopranose [50]. The presence of D-glucosamine is also reported in the gum [51].

SCIENTIFIC REPORT

Hypoglycemic

The seed oil possesses active constituents capable of lowering blood glucose in both norm and hyperglycemic animals [52]. The aqueous extract of the leaves produced some hypoglycemia in normal and diabetic rats, [53]. Effect of water soluble alcoholic extract of A. Indica leaves on isolated tissue preparation were studied with a view to find out the possible mechanism of its reported anti-hyperglycemic effect [54]. Neem oil produced a significant blood glucose lowering activity in normal as well as alloxan induced diabetic rats after 3h and 6h. The decrease in blood glucose level was more pronounced in hyperglycemic rats.

Abortive effect: Seed and leaf extract [55]

Analgesic effect: Leaves [56, 57].

Anti-dermatomic effect: Leaves [57, 58].

Antifertility effect: Neem oil [59-69].

Anti-inflammatory effect: Leaves [70, 71].

Gastric antiulcer effect: Leaves [72].

Hypotensive effect: Leaves [73]

Immuno modulatory effect: Stem bark [74].

Larvicidal effect: Isolated hydrocarbon fraction from dried leaves (Okpanyi and Ezeukwu, 1981)

Metabolic effect: Seed [75]

Neuropsycho pharmacological effect: Leaves [76].

Toxic effect: Neem oil [77]
MIQDARE KHORAK (Dose)
The doses described for Neem’s different parts by various Unani physicians are as follows:

- 3-6 gm (leaves decoction) [1]
- 2-4 Tola (Arq of root) [1]
- 8-10 gm (Arq of bark) [2]
- 9-6 gm. (Leaves Decoction) [3]
- 1 Misqal (Fruit) [4]
- 2-4 Tola (Whole plant Arq) [2, 6]

MUZIR (Adverse Effect)
Neem has adverse effect on the dry Misaj (temperament) people. [1, 5-8]

MUSLEH (Corrective)
Shahad (Honey), Filfil Siyah (Piper nigrum) and Roghaniyat are the drugs recommended as corrective (Musleh) for possible side effects caused by Neem [1, 2, 5].

METHODOLOGY
The databases used to get information from journals and articles are Google, PubMed, Science Direct, Scopus and Google Scholar. For the search of primordial and current Unani Classical literature author visited Library of Regional Research Institute of Unani Medicine (RRUUM), Srinagar, J & K India.

CONCLUSION
The parts (Green Leaves, Ripe fruits and its coat, Neem seed, Root, Bark, Uncrushed twigs, Stem bark, Root bark, Fresh whole fruit and Dry leaves) of Azadirachta indica (Neem) have been in use since times immemorial to treat the wide range of disease. It has been subjected to somewhat extensive phytochemical, experimental and clinical investigations. Experimental studies have demonstrated its anti-fungal, anti-aging, antibacterial, Anti-diabetic, Abortive effect, antihypertensive, anti-inflammatory, antioxidant, antispasmodic, antitussive, reflux esophagitis, Abortive dermatophytic effect, C. albicans, K. T. D. and Labadei, 1988; 1:186.

Ghulam, Hs, Ganjeeno-e Tib Muntazmat, Matha Muntazmat, Agra: 1888; 365-366.


The authors are also grateful to librarian (Mrs. Koohi) and authors/editors/publishers of all those books, article and treaties from where the reference for this article has been taken.

ACKNOWLEDGEMENT
I gratefully thank to my Supervisor and HOD Moalijat Prof. Dr. Naquihul Alam for his encouragement, supervision and proper support, that simplicity my work to write this paper. I am heartily thankful to Dr. Qamar Alam Khan (Clinical Registrar, Majeedia Unani Hospital and School of Unani Medical Education & Research, Jamia Hamdard, New Delhi) for his idea & support in collecting and modeling this paper. The authors are also grateful to librarian (Mrs. Koohi) and authors/editors/publishers of all those books, article and treaties from where the reference for this article has been taken.

REFERENCES