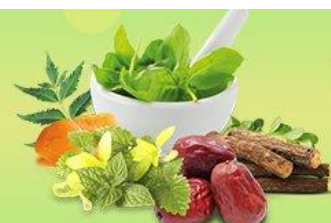


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A review of Mazu and its medicinal uses in Unani medicine

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Abstract

A Gall is an abnormal growth of plant tissue produced by animal agency acting from within.¹ Any organ of the plant may become the seat of this hyperplasia, but the form which the gall ultimately assumes is governed by the potentialities of growth in the part attacked, and by the nature of the animal excitation present. Oak galls (Mazu) is an out growths formed on the young twigs of the dyer's oak, *Quercus infectoria* (Fagaceae), as a result of the deposition of the eggs of the gall-wasp, this is used for medicinal purposes before escape of insects in dried form as described by classical Unani literature. Keeping in view of the medicinal properties described in ancient Unani scholars and scientific research on various medicinal properties of oak galls (Mazu), this paper an attempt to correlate the properties of Mazu with latest scientific research.

Keywords: Oak galls, *Mazu*, *Quercus infectoria*, wound healing activity

Introduction

Galls are irregular plant growths which are stimulated by the reaction between plant hormones and powerful growth regulating chemicals produced by some insects or mites. Galls may occur on leaves, bark, flowers, buds, acorns, or roots. Leaf and twig galls are most noticeable. The inhabitant gains its nutrients from the inner gall tissue. Different organisms have the ability to induce galls in plants; insect-induced galls are the most elaborate and diverse. Some hypotheses have been proposed to explain the induction mechanism of plant galls by insects. The most general hypothesis suggests that gall formation is triggered by the action of chemical substances secreted by the gall inducer, including plant growth regulators such as auxins, cytokinins, indole-3-acetic acid (IAA), and other types of compounds. Besides insects, plant galls are also induced by a great variety of organisms such as bacteria, fungi, nematodes, and mites^[2, 3, 4, 5]. Galls induced by insects are distinct from those induced by fungi and bacteria in their form, organization, and complexity. More complex and diverse galls are induced by insects such as those of the Cynipidae and Cecidiomyiidae families, which show extreme examples of radial symmetry, belonging to the orders Hymenoptera and Diptera, respectively^[6, 7, 5]. *Mazu* (Oak gall/Aleppo oak) is a well-known type of gall produced by the result of a puncture made in the bark by an insect *Diplolepis gallaetinctoriae*, or *Synip squercufolii* for the purpose of depositing its eggs. Generally Oak galls or Oak apple galls are large (1- to 2-inch diameter) rounded growths that are filled with a spongy mass. A single wasp larva is located in a hard seed-like cell in the center. Galls are usually found on the petioles or midribs of leaves. They will dry to a brown, paper thin wall. Removing and destroying galls before they dry and wasps emerge from a hole may help to reduce the infestation. While large and spectacular, they cause no measurable harm. *Q. infectoria* is indigenous to Turkey, Iran, Iraq, Kurdistan and Greece etc. The tree is occasionally cultivated for commercial uses. *Quercus infectoria*, the Aleppo oak, is a species of oak, bearing galls that have been traditionally used for centuries in Asia medicinally. Manjakani is the name used in Malaysia for the galls; these have been used for centuries in softening leather and in making black dye and ink. In India the galls are called majuphal among many other names^[8].

Taxonomical Classification

Domain: Eukaryota
Kingdom: Plantae
Phylum: Spermatophyta

Subphylum: Angiospermae
Class: Dicotyledonae
Order: Fagales
Family: Fagaceae
Genus: Quercus
Species: *Quercus infectoria*

Synonyms

Quercus thirkeana K. Koch, *Quercus grosses errata* Kotschy ex Wenz^[9], *Quercus puberula* O. Schwarz, *Quercus tenuicola* Boiss^[10].

Vernacular names

The plant is known by different vernacular names in different language, area and traditions:

Arabic: Ufas;^[11]

Unani: Iqaqualees;^[12, 13]

Urdu: Mazu;^[11]

Persian: Mazu;^[11, 14, 15, 16]

English: Oak galls, Turkey galls, dyer's oak;^[11, 17, 14, 15, 16]

Sanskrit: Majuphal;^[11, 18]

Hindi: Mazu, Mazuphal;^[11, 17, 14, 15, 16]

Marathi: Maiphala;^[11]

Guajarati: Mayaphal;^[11, 12, 15, 16]

Kannada: Machikai;^[11]

Telugu: Machikaya;^[11, 18, 16]

Tamil: Mashikai;^[11, 12, 16]

Malayalam: Majakani;^[11, 12, 16]

Bengali: Majuphal;^[11, 12, 15, 16]

Wajah Tasmiyah (Etymology)

The term *Quercus* comes from quercus, the Latin name for oak, a plant sacred to Jupiter.

The specific epithet *infectoria* comes from inficio dye, color: dye, which serves to dye.

Habitat and Distribution

This evergreen Shrub growing to 1.8 m (6ft) at a medium rate.

Most of the species are monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind.

Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: acid, neutral and basic (alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. The plant is grows in Woodland Garden Sunny Edge; Dappled Shade; Shady Edge etc.^[19, 20]

Mahiyat (Morphology)

Found in Greece, Asia Minor and Iran. It is a small tree or shrub growing to 4 to 6 feet tall, crooked, with smooth and bright leaves, acorn long and narrow, scaly and downy. It can grow in semi-shade or no shade and requires moist soil. The flowers are monoecious and are pollinated by wind. The gall arising in the branches of the tree is called as 'majuphal' in Sanskrit and 'machakai' in Kannada.^[21] These galls are the vegetable growths formed on the young twigs of the dyer's oak, *Quercus infectoria* (Fagaceae), as a result of the deposition of the eggs of the gall-wasp *Adleria gallectinctoriae* among the leaf buds of the plant.^[13, 15, 16, 22, 23, 24] Aleppo galls are globular in shape, 10-25 mm in diameter, average weight is about 3.8 gm (1.8-4.2gm). They have short, basal stalk and numerous round projections

on the surface galls have no specific odour and have a very astringent taste followed by a sensation of sweetness. The so called 'blue' variety of oak/galls is actually of grey or brownish grey color. These and the olive green galls are preferred to 'white' variety, in which tannin content is less. White galls also differ in having a circular canal through which the insect has emerged. Galls without opening have insect remains in the small central cavity^[13, 25, 22, 24].

Husool (Cultivation and Collection)

Prefers a good deep fertile loam which can be on the stiff side^[26, 27].

Young plants tolerate reasonable levels of side shade^[28]. Tolerates moderate exposure, surviving well but being somewhat stunted^[28].

Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage over winter^[28].

Intolerant of root disturbance, trees should be planted in their permanent positions whilst young: Hybridizes freely with other members of the genus^[28].

Plants in this genus are notably resistant to honey fungus^[28].



Fig 1: Matured mazu fal (*Quercus infectoria*)



Fig 2: Leaves of *Q. infectoria*



Fig 3: Unripe *Q. infectoria*

Propagation

Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees [29]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

Hisas Mustamla (Part Used)

Excrescence is used for medicinal purposes [11, 15, 16].

Mizaj (Temperament)

Cold I and dry II, [13, 15, 16, 24, 30, 31]

Cold II and dry III [14, 16, 30, 31].

Miqdar Khurak (Dose)

Dose of Gall powder is -3 gram (API, Vol.4)

Gall: 1-3 gm powder [15, 31] 4 masha [15, 30] 10-20grains powder infusion or decoction (1:13) [16].

Muzir Asrat (Adverse Effects)

Chest/ throat diseases [14, 16, 30].

Musleh (Corrective) and Badal (Substitute)

Katira, samagharabi, zardi baize neem brisht (half fry egg) [15, 16, 30].

Maaei, [15, 16, 30] juft baloot, post anar, halilazard [15, 16, 31].

Afa'al (Pharmacological Actions)

As per the studies on mazu it has analgesic, antidote, alkaloid, astringent, hypoglycemic, styptic, sedative, tonic, antibacterial, anti-fungal, anti-viral and anti-inflammatory, anti-ulcer activities etc. [32, 33, 34].

Istematat (Therapeutic uses in different diseases and forms)

Aakela. Applied locally as paste or as a dusting powder [15, 30, 30, 31].

Daus Salab (a type of Alopecia). Applied locally as paste mixed with vinegar [15, 16, 30, 31].

Khuruj-e-Maqad (Anal prolapse). Decoction is used as sitz bath or as abdasht, or its decoction is applied as a paste [15, 16, 30, 31].

Quruh-e-Maqad (Anal ulcer). In form of sitz bath and aabdasht or locally as paste or dusting powder [15, 16, 30, 31].

Qula-e dahan (Apthous ulcers). Decoction is mixed with vinegar and used in form of mouthwash [14, 30].

Araq-e-muntin (foul sweating). Applied or rubbed on body

[14, 16, 30, 31].

Ishal-e-kuhna (Chronic diarrhea): Orally in the form of powder along with water [11, 15, 16, 31, 32].

Damaa (Dhalka) (Epiphora): Very fine powder can be used as kohl, surma [15, 16, 30].

Ruaaf (Epistaxis): In form of khesanda or nakchhikni [15, 16, 30].

Jhaein (Freckles): Mixed with vinegar and applied locally as paste [15, 16, 30, 31].

Waram-e-lissa (Gingivitis): Powder/decoction is mixed with vinegar and rubbed or applied locally on teeth and gums or mix it in tooth powders [15, 16, 30, 31].

Baulud-Dam (Hematuria): First heated on flames and then its powder is mixed with vinegar, taken orally, or as humool (suppository) [16, 30, 31].

Namla(Herpes). Mixed it with vinegar and applied locally as dusting Powder [16, 30, 31].

Kasratearaq (Hyperhydrosis): Applied or rubbed all over body [15, 16, 30, 31].

Qarha-e-am'aa (Intestinal ulcer): Powder orally with water [15, 16].

Sailanur Raham (Leucorrhea). Powder is taken orally with water, its decoction is used as sitz bath or as abdasht [15, 30, 31].

Kasrat-e-Haiz (Menorrhagia): Powder is taken orally with water [15, 16, 30, 31].

Warm-e-Halaq (Pharyngitis): Decoction is used as mouthwash and for gargle [16, 31].

Waram-e-Maqad (Proctitis): Applied locally as paste, or as a dusting powder [15, 31].

Daad (Ringworm): Applied locally as paste when mixed with vinegar [16, 30, 31].

Salaq ((Blephritis)): Used as kohl, surma [15, 16, 30].

Khuruj-e-rahazm (Uterine prolapse): Decoction is used as sitz bath or as abdasht [15, 31].

Qarha (Wound): As a dusting powder on fresh wounds [15, 30].

Kimiya'wi Ajza (Chemical Constituents)

Phytochemical screening of galls shows the presence of saponins, alkaloids, tannins, glycosides, triterpenes, sterols, phenolic compounds, carbohydrates, and flavonoids [35, 36]. The main constituents found in the galls of QI are tannin (50–70%), gallic acid, and ellagic acid [37]. The gall extracts show antimicrobial, analgesic, and antioxidant activity [38]. Ellagic acid has anticarcinogenic and antioxidant properties [39]. The tannic acid belongs to the group of water-soluble metabolites and has the ability to complex macromolecules and metal ions, which gives it antioxidant, antimicrobial, and healing activity [40]. The main phytoconstituents found in the galls of *Quercus infectoria* (QI) are tannin (50–70%), gallic acid, and ellagic acid. Other constituents are saponins, alkaloids, glycosides, triterpenes, sterols, phenolic compounds, carbohydrates, and flavonoids. All these exert many functions particularly anti-inflammatory, wound healing, scavenging and antioxidant.

Pharmacological Studies

Anti-inflammatory Action (*Muhallile auram*)

Anti-inflammatory effect of mazu has been evaluated in various animal studies. Kaur *et al.* (2008) had done a study to evaluate anti-inflammatory effect of alcoholic extract of *Quercus infectoria* galls on various experimental models of inflammation. Oral administration of gall extract

significantly inhibited carrageenan, histamine, serotonin and prostaglandin E2 induced paw edemas, while topical application of gall extract inhibited phorbol-12-myristate-13-acetate induced ear inflammation. The extract also inhibited various function of macrophages and Neutrophils relevant to the inflammatory response ^[41].

Wound Healing Property (Mudammile qurooh)

In an experimental trial carried out by Umachigi SP *et al.* (2008) ethanol extract of galls were studied in rat at two different dose level of 400 and 800mg/kg. The plant showed a definite positive effect on wound healing, with a significant increase the level of the level of the antioxidant enzyme, superoxidat dismutase and catalase, in the granuloma tissue ^[42].

Antioxidant Property (Dafe Taffun)

In another Nur Syukriah *et al.* (2014) study ethanol, acetone and water extract of *Quercus infectoria* were evaluated for antioxidant activity via DPPH radical scavenging and metal chelating assays. Ethanolic extract have the highest antioxidant activity with 94±0.05 using DPPH assay, other extracts had less activity. Potent antioxidant activities may be due to high presence of flavonoid and tannins ^[43].

Kaur *et al.* (2008) also investigated ethanolic extract of *QI* for anti oxidant activity *in vitro* model system the result concluded that the galls posses potent antioxidant activity, when tested both chemical as well as biological model ^[44].

Another study was conducted by Ayub *et al.* to determine the antioxidant activity of *QI* gall, by using different *in vitro* methodologies. The antioxidant activity was determined by the 2, 2 diphenyl picrylhydrazyl (DPPH) assay and a carotene bleaching assay and compared with that of the butylatedhydroxyl toluene (BHT). The result showed that among aquatic, ethanolic and methanolic, extract of *Quercus infectoria* galls, water extract have high antioxidant activist ^[45].

The *Quercus infectoria* extract mechanism of action could also be thought to depend on the degradation of bacterial cell walls, destruction of cytoplasmic membrane proteins, leakage of cell contents, coagulation of cytoplasm, and reduction in the proton motive force or binding with some synthesis proteins ^[46].

Conclusion

Mazu (oak gall) is an important medicinal and commercial plant obtained from the *Quercus infectoria* of Fagaceae family, which is claimed for the treatment of various inflammatory diseases and as a wound healing agent as well as astringent, hypoglycemic, styptic and sedative properties. From the above review work it is clearly concluded that the Oak gall could be used in the treatment of intertrigo, impetigo and eczema, haemorrhages, chronic diarrhea and dysentery.

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