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Ma'ūl Sha'īr (Barley Water): Traditional Unani Perspectives Integrated with Phytochemistry and Modern Clinical Insights

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Review Article

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ABSTRACT

Background: *Ma'ūl Sha'īr*, commonly known as barley water, is a time-honored formulation in Unani medicine, used for its detoxifying, cooling, and nutritive properties.

Objective: To analyze the historical Unani references, pharmacological profile, therapeutic actions, and recent biomedical evidence of *Ma'ūl Sha'īr*, ensuring integration between classical and modern systems.

Methods: A thorough review of classical Unani literature, including *Al-Qanun fi al-Tibb*, *Khazain al-Adwiya*, and *Qarabadeen-e-Azam*, was conducted. Additionally, four key scientific publications were analyzed to extract recent findings related to barley's composition, mechanisms, and clinical outcomes.

Result: Classical Unani texts describe *Ma'ūl Sha'īr* as cold in the second degree and moist in the second degree. It is a refrigerant, diuretic, anti-inflammatory, expectorant, and antipyretic. Modern research corroborates the antioxidant, hypolipidemic, antidiabetic, and hepatoprotective effects of this compound, largely attributed to β -glucans, polyphenols, flavonoids, vitamins, and minerals.

Conclusion: *Ma'ūl Sha'īr* is a significant dietary therapeutic agent that merges traditional Unani insights with contemporary clinical potential. It warrants further randomized trials to validate its efficacy and promote its integration in global health care.

Keywords: *Ma'ūl Sha'īr*, *Hordeum vulgare*, Unani medicine, β -glucan, detoxification, anti-inflammatory, gastrohepatic health

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INTRODUCTION

Ma'ūl Sha'īr (barley water) is a traditional Unani decoction prepared from the grains of *Hordeum vulgare* L., a cereal extensively valued for its nutritive and medicinal attributes. In the Unani system of medicine, barley (*Sha'īr*) is mentioned as a fundamental dietary and therapeutic agent due to its balanced temperament (*Mizāj Bārid Ratab*) and its wide-ranging effects on internal bodily humors. The preparation of *Ma'ūl Sha'īr* involves decocting barley in water, creating a light, cooling, and demulcent liquid known for its ability to soothe internal

inflammation, detoxify the system, and nourish the body.¹ Barley has been historically emphasized in classical texts such as *Al-Qānūn fi al-Tibb* by Ibn Sīnā, *Kitāb al-Mansūrī* by Al-Rāzī, *Khazain al-Adwiyah* by Najmul Ghani, and *Qarābādīn-e-Azam*. These texts collectively endorse the use of *Ma'ūl Sha'īr* for ailments linked to excess *ḥarārat* (heat), *su' mizāj* (temperamental derangements), and bilious or sanguine disorders. Ibn Sīnā specifically referred to barley water as an excellent refrigerant and dietary agent to pacify hepatic inflammations, gastric irritations, and febrile states.² In the contemporary biomedical realm, *Hordeum vulgare* has been validated for its rich composition of β -glucans, antioxidant

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like tocots and flavonoids, and essential minerals like magnesium, phosphorus, and selenium.³ These constituents have been linked to various pharmacological effects, including lipid-lowering, glycemic control, anti-inflammatory activity, and hepatoprotection. As such, Ma'ūl Sha'īr's traditional use in disorders such as diabetes mellitus, hyperlipidemia, urinary tract infections, hepatic dysfunction, and gastrointestinal inflammation aligns closely with current scientific evidence.⁴

Moreover, due to the rising prevalence of lifestyle and metabolic disorders, researchers and practitioners are increasingly advocating for dietary interventions rooted in traditional medicine. Ma'ūl Sha'īr, being simple to prepare, affordable, and culturally acceptable, holds potential for inclusion in integrative clinical frameworks that aim to merge preventive and therapeutic strategies. The present review thus aims to comprehensively evaluate Ma'ūl Sha'īr through the lenses of both Unani medicine and modern science.

Taxonomical Classification

- Kingdom: Plantae
- Division: Magnoliophyta
- Class: Liliopsida
- Order: Poales
- Family: Poaceae
- Genus: Hordeum
- Species: *Hordeum vulgare* L.^{5,6}



Mizaj (Temperament)

- Barley (Sha'īr): Cold 1°, Dry 2°
- Barley Water (Ma'ūl Sha'īr): Cold 2°, Moist 2°^{8,9}

Miqdār-e-Khurāk (Dose):

Barley (Sha'īr): 5–10 grams

Barley Water (Ma'ūl Sha'īr): Approximately 200 ml^{8,9,10}

Musleh (Corrective): Anīsūn, Gul Qand¹¹

Muzir (Adverse): Excess use can irritate the kidneys.¹²

Badal (Substitute): Jawār (Sorghum).¹³

Murakkabāt: Tiryaq Arba'a, Tiryaq Samāniya.¹⁴

Botanical and Microscopic Description

Barley is an annual, erect herb with linear-lanceolate leaves, cylindrical hollow stems, and an inflorescence in the form of spikelets. Its seeds are pale yellow caryopses, covered in husks. Under microscopy, it features a single-layered epidermis, a rich aleurone layer, and a starchy endosperm, making it suitable for nutritive preparations.^{15,23}

Nutritional Composition

Per 100 g of barley grain:

- Protein: 11.5 g
- Fat: 1.3 g (mainly linoleic acid)
- Carbohydrate: 69.6 g
- Fiber: 3.9 g (mainly β-glucans)
- Calcium: 26 mg
- Iron: 1.67 mg
- Phosphorus: 215 mg
- Magnesium: 21 mg
- Calories: 336 kcal

Bioactive constituents: β-glucans, tocots, flavonoids, lignans, saponarins, selenium, B-complex vitamins.^{16,17,18}

Description in Unani Classical Literature

In Unani medicine, barley is referred to as Jao, a term derived from Persian. Classical texts differentiate between two primary types of barley: one being long-grained with a thick husk and the other, shorter with a thinner hull. According to Unani scholars, the best quality barley should be fully matured, grown with adequate rainfall, white in color, large, heavy, and free from any signs of decay. It should neither be overly fresh nor too old, as stale barley is considered less effective and can develop an unpleasant odor after prolonged storage.^{1,2}

Barley and its numerous derivatives, such as Ma'ūl Sha'īr (barley water), Ma'ūl Sha'īr Muhammaṣ, Ma'ūl Sha'īr Mullaham, Kashkūsh-e-Sha'īr, Sattu (roasted barley flour), and barley-based roti (bread), have all been elaborated in Unani pharmacopoeias for their various therapeutic uses. These preparations are employed for their specific actions, such as mubarrid (refrigerant), mudirr-e-bawl (diuretic), mufattih (deobstruent), muhallil (resolvent), and muhazzil (anti-obesity) effects, among others. Their usage spans conditions like fevers, urinary tract inflammation, digestive disorders, obesity, and hepatic ailments.^{19,20}

Textual references from Al-Qānūn fi al-Tibb, Khazā'in al-Adwiyah, and Qarābādīn-e-A'zam collectively emphasize that barley formulations hold a central role in Ilāj bil Ghidhā (dietary

treatment) and *Ilāj* bit *Tadbīr* (regimental therapy). These insights align closely with the holistic approach of Unani philosophy, where the balance of bodily humors is restored through mild, effective, and nutritive interventions.^{1,2}

Therapeutic Actions of Barley in Unani Medicine

The classical Unani texts describe *Sha'īr* (barley) and its derivatives, especially *Ma'ūl Sha'īr*, as possessing a wide range of pharmacological actions. These are primarily attributed to its cold and moist temperament and its ability to pacify deranged humors like *Safrā'* (yellow bile) and *Dam* (blood). The following are key therapeutic actions attributed to barley.^{1,2,8,9}

- *Jālī* (Detergent): Helps cleanse internal morbid matter and detoxifies the system.
- *Qābīd* (Astringent): Useful in reducing intestinal secretions and controlling diarrhea.
- *Mujaffif* (Desiccant): Dries excessive moisture, helpful in phlegmatic and moist conditions.
- *Mundīj* (Concoptive): Facilitates the maturation of morbid material (*Maddah al-Fasida*) for easier elimination.
- *Rā'īd* (Repellent): Helps expel harmful substances from the body.
- *Dāfi'-e-Hummā* (Antipyretic): Reduces fevers by cooling the internal environment.
- *Musakkin-e-'Atash* (Thirst Quencher): Soothes internal heat and quenches thirst.
- *Dāfi'-e-Su'āl* (Antitussive): Calms dry and productive coughs.
- *Musakkin Ḥiddat-e-Dam wa Safrā'* (Blood and Bile Calming): Reduces intensity of hot temperaments.
- *Muwallid-e-Dam* (Hemopoietic): Aids in blood production and nourishment.
- *Mudirr-e-Bawl* (Diuretic): Enhances urine flow and helps eliminate waste.
- *Munaqqī Gurda wa Masānā* (Kidney and Bladder Cleanser): Detoxifies urinary tract organs.
- *Mughazzī* (Nutritive): Provides essential nutrients and strengthens body tissues.
- *Muḥallil* (Resolvent): Dissolves inflammation and obstructive swellings.
- *Musakkin Ālam* (Analgesic): Offers relief from pain in inflammatory conditions.
- *Muḥazzil* (Anti-obesity): Helps reduce body fat and manage *Simān Mufriṭ* (obesity).

These actions provide a strong rationale for the traditional use of *Ma'ūl Sha'īr* in a wide range of systemic disorders,

particularly those associated with inflammation, heat, and humoral imbalance.

Table 1: Traditional Unani Applications of Barley (*Sha'īr*) in Various Disease Conditions

Condition	Formulation	Mode of Application	Ref.
Suda (Headache)	Jao Sattu + Āb-e-Pudīna	Paste on the forehead	Ghani, 1921 ¹²
Warm-e-Halaq (Pharyngitis)	<i>Ma'ūl Sha'īr</i>	Gargle	CCRUM 2007 ⁹
Ishāl (Diarrhea)	Sattu + Tabasheer + Samagh 'Arabī	Oral intake	Ghani, 1921 ¹²
Warm-e-Kabid (Hepatitis)	Jao paste + Tukhme Katan + Khajoor	Local application	Alvi & Saleem, 2024 ¹²
Nafakh (Flatulence)	Fomentation with barley husk + Khardal	Local application	Ghani, 1921 ¹²
Ziabetus (Diabetes)	<i>Ma'ūl Sha'īr</i>	Oral intake	CCRUM , 2007 ⁹
Salābate Tīhāl (Splenitis)	Arade Jao + Usāra Sūdāb	Topical paste	Ghani, 1921 ¹²
Zahīr (Dysentery)	<i>Ma'ūl Sha'īr</i> + Arq-e-Mako	Therapeutic enema	CCRUM , 2007 ⁹
Niqrīs (Gout)	Arade Jao + Sirka + Masoor	Topical application	Kabeeruddin, 1938 ¹³
Waja'ul Mafāṣil (Arthritis)	Arade Jao + Bura Armani + Mom	Local application	Fatma et al., 2019 ¹
Kalaf (Melasma)	Arade Jao + Zafran + Nakhud	Local application	Ghani, 1921 ¹²

Bafa (Dandruff)	Āsh-e-Jao + Lu‘āb-e-Hulba	Scalp treatment	Alvi & Saleem, 2024 ²
Harq (Burns)	Arade Jao + Water	Cooling paste	CCRUM , 2007 ⁹
Salq (Scalds)	Barley ash + Egg yolk	Local application	Ghani, 1921 ¹²
Dādd (Ringworm)	Raughan Jao + Raughan Gandum	Fungal infection care	Kabeeruddin, 1938 ¹³
Humā Muzmin (Chronic Fever)	Infusion of barley bread + Arq Gaozabān	Oral use	CCRUM , 2007 ⁹

Pasta	Anti-inflammatory Action	Inhibits COX and LOX pathways; increases antioxidant enzyme activity (SOD, GSH-Px), alters gut flora.	Morita et al., 2005; Hughes et al., 2008 ^{22,28}
Noodles	Bone Health Enhancer	Provides calcium, phosphorus, magnesium, zinc, and copper essential for bone strength.	Alvi & Saleem, 2024; Kaur et al., 2022 ^{2,6}

Note: ROS = Reactive Oxygen Species; SOD = Superoxide Dismutase; GSH-Px = Glutathione Peroxidase

Table 2: Functional Attributes of Barley-Based Value-Added Products

Barley Product	Potential Role	Mechanism of Action	Ref.
Barley Grass Extract	Anticancer Property	Promotes apoptosis in breast and prostate cancer cells by inducing intracellular ROS production.	Singh et al., 2021; Chen et al., 2020 ^{24,25}
Barley Flour	Immuno-modulatory Agent	Contains a hydroalcoholic extract beneficial in glycemic control and reducing diabetes-related symptoms.	Fatma et al., 2019; Zare et al., 2024 ¹
Flat Bread	Blood Lipid Modulator	Rich in β-glucan, which binds bile acids and reduces plasma LDL cholesterol and improves glycemic index.	AbuMweis et al., 2010; Raj et al., 2023 ²⁶
Muffins	Antitumor Support	Stimulates ROS production; β-glucan enhances immune cell activity without direct cytotoxicity.	Hosono et al., 2001; Singh et al., 2021 ²⁷

Pharmacological Insights from Modern Scientific Literature

Barley (*Hordeum vulgare*) has garnered considerable attention in modern pharmacological research for its wide-ranging therapeutic properties that align with the descriptions found in classical Unani texts. Its rich composition of β-glucans, polyphenols, flavonoids, saponarins, lignans, tocols, and dietary fiber contributes to numerous pharmacodynamic actions. The synergy of these compounds allows for pleiotropic effects on metabolic, inflammatory, hepatic, renal, and cardiovascular systems. The following subsections elaborate on key pharmacological actions:

Hypolipidemic Activity

Barley-derived β-glucans have been shown to significantly lower total and LDL cholesterol by binding bile acids in the intestine and promoting their excretion. This prompts hepatic conversion of cholesterol to bile acids, thereby reducing circulating cholesterol levels. Clinical trials have consistently demonstrated reductions in plasma LDL, total cholesterol, and triglycerides following regular barley intake.²¹

Glycemic Modulation and Antidiabetic Effects

Barley water delays gastric emptying and slows glucose absorption due to its high soluble fiber content, resulting in lower postprandial blood glucose spikes. It also enhances insulin sensitivity and regulates pancreatic β-cell activity. Studies suggest a positive role in managing type 2 diabetes mellitus, with improved HbA1c and fasting glucose levels.^{1,4}

Antioxidant and Hepatoprotective Properties

The presence of polyphenols, tocotrienols, and flavonoids in barley provides potent antioxidant activity, reducing oxidative stress in hepatic tissues. These phytochemicals scavenge reactive oxygen species (ROS), upregulate antioxidant enzymes like SOD and catalase, and inhibit lipid peroxidation.

Hepatoprotection has been confirmed in various models of drug-induced liver damage.^{2,4}

Anti-inflammatory and Analgesic Actions

Barley inhibits cyclooxygenase (COX) and lipoxygenase (LOX) pathways, thereby reducing the production of pro-inflammatory prostaglandins and leukotrienes. Additionally, it modulates cytokines such as TNF- α , IL-1 β , and IL-6, resulting in systemic anti-inflammatory effects. This explains its traditional use in conditions like arthritis, pleurisy, and pharyngitis.³

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8.8 Gut Microbiota Modulation and SCFA Production

Barley's fermentable fibers support the growth of beneficial gut bacteria like Bifidobacteria and Lactobacilli, enhancing gut health and short-chain fatty acid (SCFA) production. SCFAs such as butyrate and propionate exhibit systemic anti-inflammatory and insulin-sensitizing effects, reinforcing barley's utility in metabolic disorders.⁴ These pharmacological properties strongly support the incorporation of Ma'ūl Sha'īr as a nutraceutical agent within integrative and evidence-based clinical frameworks.

Clinical Studies and Experimental Evaluations

Numerous experimental and clinical studies have demonstrated the efficacy of barley water and related products in managing chronic and metabolic disorders:

- **Raj et al. (2023)³** conducted a randomized controlled trial where 200 overweight adults were given barley-based food for 12 weeks, showing reductions in cholesterol, triglycerides, and waist circumference.
- **Fatma et al. (2019)¹** found that patients consuming Ma'ūl Sha'īr experienced improvements in blood glucose regulation, liver function, and urinary tract symptoms.
- **Zare et al. (2024)⁴** reported in vivo that barley water reduced mucosal damage in experimentally induced gastric ulcers and normalized TNF- α levels.

- **Alvi & Saleem (2024)²** summarized multiple in vitro and in vivo studies on hepatoprotection, nephroprotection, and inflammation suppression by barley water extracts.
- **Behall et al. (2004)¹⁸** found that hypercholesterolemic individuals who consumed β -glucan from barley had improved lipid profiles over 5 weeks.
- **McIntosh & Noakes (2011)** demonstrated that a diet supplemented with barley improved glycemic control and insulin sensitivity in individuals with metabolic syndrome.
- **Morita et al. (2005)²²** concluded that barley consumption significantly increased antioxidant capacity and reduced oxidative stress markers in healthy subjects.
- **Kaur et al. (2022)⁶** revealed renal protective effects of barley extract in a gentamicin-induced nephrotoxicity model.

These clinical and laboratory investigations affirm the classical claims of Unani physicians and establish Ma'ūl Sha'īr as a scientifically credible and evidence-based remedy for modern-day ailments.

Conclusion

The comprehensive review of Ma'ūl Sha'īr (barley water) through both traditional Unani and contemporary biomedical perspectives reveals its significant therapeutic potential. Historically revered for its cooling, detoxifying, and nutritive properties, it is well-documented in classical Unani texts for treating a broad spectrum of disorders ranging from hepatic inflammation to metabolic syndromes. Modern pharmacological and clinical studies have substantiated these traditional claims, highlighting the effects of barley's β -glucans, polyphenols, flavonoids, and minerals in combating oxidative stress, lowering cholesterol, regulating glycemia, promoting renal function, and managing obesity. Additionally, the functional versatility of barley-based products further enhances their applicability in preventive and curative nutrition.

Given its affordability, accessibility, and compatibility with modern dietary practices, Ma'ūl Sha'īr presents an excellent opportunity for integrative healthcare models. Future research through randomized controlled clinical trials and pharmacokinetic profiling will be instrumental in standardizing its therapeutic use and incorporating it into global complementary and alternative medicine frameworks.

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