Therapeutic Potential of *Habb-ul-Ghar (Laurus nobilis* L.*)*: A Boon for Unani Medicine

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Abstract:

Habb-ul-Ghar (*Laurus nobilis* L.), a key medicinal plant in Unani medicine, has been traditionally valued for its anti-dotal and protective properties. As concerns over the side effects and limitations of synthetic drugs continue to grow, *Larus nobilis* L. emerges as a promising natural alternative for detoxification and broad-spectrum therapeutic use. Unani classical texts credit it with diverse pharmacological actions including *Tiryāq-e-Sumoom* (Antidote), *Musakkin-i-Alam* (Analgesic), *Muḥallil* (Resolvent)**,** *Muḥarrik-i-Aʻṣāb* (Nervine stimulant), *Muqawwi-i-Ḥafiẓa* (Memory tonic) and *Muddir-i-Bawl* (Diuretic) etc. Recent studies affirm the traditional use of *Laurus nobilis L.*, highlighting its potent neuro-protective, anti-inflammatory, anti-diabetic, anti-microbial, and anti-cancer effects. Its diverse phytochemicals and aromatic oils drive its growing relevance in cosmetics, food preservation, pharmaceuticals, and advanced nano-formulations for cancer therapy. This review consolidates current findings and underscores the need for further research to validate its therapeutic efficacy and support its integration into evidence-based clinical practice.

Keywords: *Laurus nobilis* L., *Habb-ul-Ghar*, Unani medicine, Antidote, Integrative medicine

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Introduction:

The limitations of synthetic medications, particularly in terms of side effects, treatment resistance, and economic burden, have revitalized interest in natural products research, especially the exploration of bioactive compounds from medicinal plants. One of the most interesting study topics is the use of medicinal plants as natural remedies; this practice has been a part of traditional medical systems for a long time and is becoming more and more supported by recent pharmacological studies. There is a pressing demand for safer and more efficient detoxification agents due to the increased prevalence of chemical poisoning, drug-induced toxicity, and environmental contamination. In settings with limited resources, conventional anti-dotal therapies often face challenges including limited specificity, adverse side effects, and issues related to accessibility. Herbal remedies offer a promising alternative due to their broad-spectrum bioactivity, lower toxicity, and a longstanding history of efficacy in toxin neutralization and systemic detoxification. *Habb-ul-Ghar* (*Laurus nobilis* L.) is a medicinal herb traditionally employed for its anti-dotal and protective properties. Focusing on *Habb-ul-Ghar's* therapeutic efficacy as an antidote, this review article critically examines recent research and evaluates its relevance in contemporary clinical and toxicological application.

An aromatic and medicinal species, *Habb-ul-Ghar* is a member of the Lauraceae family, comprising approximately 2,500–3,500 species [1]. The Laurus genus is comprised of two recognized species: *Laurus azorica* and *Laurus nobilis* L.. The term "Laurus" is derived from Latin, referring to the laurel tree, and is believed to trace back to the ancient Celtic word "blaur" which means "green". The specific epithet nobilis translates from Latin as "noble" or "famous" [2]. In botanical literature, *Laurus nobilis* L. is classified as an evergreen shrub endemic to the Mediterranean and is referred to by numerous common names such as sweet Bay, Bay laurel, Grecian laurel, True Bay, or Bay [3, 4].

Various parts of *Laurus nobilis* L., along with its essential oil (EO), exhibit a range of notable properties that lend themselves to potential applications across multiple sectors, such as agriculture, medicine, food, and pharmaceuticals. The leaves, in particular, are widely utilized as a fragrant and flavourful additive in culinary practices, enhancing the taste of dishes like soups, meats, fish, stews, puddings, vinegar, and beverages [6].

Within the framework of Unani medicine, its fruit is classified as *Habb-ul-Ghar* and is employed for its pharmacological benefits [5]. In *Saidla Al Jameela*, "Fareed Ahmad Abbasi" stated that *Asqaliboos Awwal* (Asklepiades, 1st Century) had begun making *Tiryāq* (Anti-dote) with just *Habb-ul-Ghar*. Four more ingredients (including *Habb-ul-Ghar*) were later added by Unani doctor *Indru Makhitz,* who gave it the name "*Tiryāq Arba.*" Due to its potential as a preventative medication in the current epidemic, *Tiryaq Arba* is becoming more and more important [7].

Bay is employed in the food industry as a natural preservative, owing to its strong antimicrobial and insecticidal properties [8, 9]. *Laurus nobilis* L. essential oil is incorporated into various cosmetic products, including soaps, fragrances, and skin creams [10]. Essential oil is obtained from the leaves and fruits of the plant, whereas fixed oil is primarily extracted from the berries [13]. Essential oils possess a range of bioactive properties, notably antibacterial, antifungal, and antioxidant activities, which

contribute to their potential in various therapeutic and industrial applications [11]. The seeds have been reported to exhibit antiulcer and antidiabetic properties [12].

Although previous studies have highlighted various beneficial effects of *Laurus nobilis* L., comprehensive analyses of its chemical profile and biological activities remain limited.

Vernacular names:

Arabic	:	Ghar [5, 18]
English	:	Sweet bay laurel, Victor's laurel [16, 19]
France	:	Apollo's laurel, Laurier d'Apollon [17]
Iran/Persian	:	Barg Boo, Laurel tree, sweet bay, Bahishtan [5, 20]
Unani	:	Daphni [15, 20]
Urdu	:	*Habb-ul-Ghar, Hub-ul-ghar* [19]

Taxonomical classification: [23, 24]

Kingdom	**:**	Plantae
Phylum	**:**	Streptophyta
Class	**:**	Equisetopsida
Division	**:**	Magnoliopsida
Order	**:**	Laurels
Family	**:**	Lauraceae
Genus	**:**	*Laurus*
Species	**:**	nobilis

Morphology (*Māhiyat*):

Laurus nobilis L. is an evergreen shrub or small tree that can attain a height of 15-20 meters under natural conditions. In cultivated settings such as gardens and residential areas, it typically grows between 4 and 6 meters. It can be trained either as a single-trunk tree or as a multi-stemmed shrub, and it tolerates regular pruning, making it suitable for ornamental shaping, including topiary. The bark is smooth and may display olive-green to reddish tones. Leaves are lanceolate to lanceolate-acuminate, alternately arranged, and borne on short petioles. The leaves have a leathery feel, translucent glands, and wavy, rolled edges. They are 5-8 cm long and 3-4 cm wide. While the bottom is drab with a noticeable midrib and veins, the upper surface is smooth and glossy, with a range of olive-green to brown. The leaves have a bitter, peppery flavour and create a strong, aromatic perfume when crushed [22].

According to the Unani Physician *Habb-ul-Ghar* refers to the fruit of the *Ghar* tree (*Laurus nobilis* L.), a long-lived evergreen species known to survive for several centuries, with some specimens reportedly reaching up to a thousand years in age [25]. It resembles the fruit of *Neem* (*Azadirachta indica*) [19] but is smaller than *Fandaq* (fruit of *Sapindus trifoliatus* L.). Like *Badam Talkh* (*Prunus dulcis*) [19], the leaves have a distinct scent when mashed and resemble *Barg Aas* (*Myrtus communis* L.) [5, 25]. When subjected to light friction between the fingertips, the fruit naturally divides into two symmetrical sections. The enclosed seeds are firm, with a smooth, glossy surface, distinctly orange in coloration, and exude a subtle aromatic quality [5, 26]. The fruits possess a distinctly bitter taste, yet emit

a pleasant and noticeable fragrance [18, 27]. The Unani medical method makes use of berries and bark either on their own or as a component of compound compositions. Europe and Asia Minor are its primary locations. Since it was unable to be grown successfully on the Nilgiri Hills in India, it is imported from overseas [28].

Geographical distribution:

Turkey is the leading producer of *Laurus nobilis* L. and exports it to over 60 countries worldwide [13], approximately 97% of global *Laurus nobilis* L. production is attributed to Turkey [14]. It is extensively cultivated across Europe, the Americas, Western Asia, Northern Africa, the Arabian Peninsula, and India [15]. This species is commercially propagated for its aromatic leaves and is also extensively utilized as an ornamental plant in both Europe and North America [29].

Part used (*Hisas-e-Mustamalah*):

In traditional Unani practice, therapeutic preparations frequently include fruits and essential oils as key bioactive ingredients [5, 18, 26]**,** in contrast, other traditional medical systems often utilize leaves and various other plant parts for therapeutic applications [15, 16, 17].

Temperament (*Mizaj*):

In the Unani system of medicine, one of the core principles of *Ilmul Advia* (pharmacology) is the concept of *Mizaj* (temperament). *Mizaj* reflects the inherent nature or disposition of a drug, describing its qualitative attributes such as hot, cold, moist, or dry. The temperament of *Habb-ul-Ghar* is generally described as hot and dry, with most classical Unani sources classifying it in the second degree [5, 18, 25, 26, 28]. However, some references suggest it may exhibit a third-degree intensity [5, 26, 30]. According to *Muhit-e-Azam*, a renowned classical text in Unani medicine, the seed of *Habb-ul-Ghar* is considered the driest part of the plant in comparison to its other parts.

Pharmacological actions (*Af'āl*):

Musakkin-i-Alam (Analgesic) [5, 18, 25], *Tiryāq-e-Sumoom* (Anti-dote), *Muqawwi-i-Ḥafiẓa* (Memory tonic) [5, 18, 26], *Muḥallil* (Resolvent) [18, 25, 26], *Muḥarrik-i-A 'ṣāb* (Nervine stimulant) [5], *Muddir-i-Bawl* (Diuretic), *Muddir-i-Ḥayḍ* (Emmenagogue) [18, 25, 26, 31], *Mufattiḥ Sang Mathāna* (Lithotriptic) [5, 25, 26, 31], *Dāfi-i- Su'āl* (Anti-Tussive), *Dāfi'-i-Tashannuj* (Antispasmodic) [5, 18, 25, 26], *Mudammil* (Healing agent) [18, 26], *Musqiṭ-i-janīn* (Abortifacient) [18, 26, 31], *Mufarriḥ* (Refrigerant) [18], *Musakkin* (Sedative) [5, 18, 25] and *Kāsir-i-Riyāḥ* (Carminative) [25, 26].

Therapeutic uses (*Mawaqa-e-Istemal*):

- The nervine stimulant action of *Habb-ul-Ghar* has shown promising results when 9 g of its powdered form was administered orally, particularly in cases of *Laqwa* (Facial palsy), *Fālij* (Paralysis), and *Khadar* (Numbness) [5, 26, 27].

  Habb-ul-Ghar has been historically utilized in Unani medicine as a potent antidote, administered both orally and topically--often with wine--for the treatment of envenomation caused by snakes, scorpions, and other toxic insect bites [5, 26, 18].

  Habb-ul-Ghar has been traditionally utilized in Unani medicine either independently or in combination with honey for the management of *Ṣudā' Balghamī* (Phlegmatic headache), *Qūlanj*

Rīḥī (Colic associated with flatulence), *Ṣara'* (Epilepsy) and *Quruh-i-Am 'ā'* (Ulcers of the intestines). Beyond its therapeutic effects on these conditions, *Habb-ul-Ghar* is also reputed for its cognitive benefits, particularly in enhancing *Quwwat Ḥafiẓa* (Faculty of memory) [5, 18, 26, 27].

- In traditional Unani medicine, *Habb-ul-Ghar* is administered in a dose of 7 grams, typically combined with *Sikanjabīn* (a vinegar and sugar preparation) or honey, to facilitate the expulsion of thick, viscous humors and to induce a mild purgative effect. An alternative therapeutic approach involves the administration of 9 grams of *Habb-ul-Ghar* powder mixed with the mucilage of *Ispaghula* (*Plantago ovata*), which has been reported to provide prompt relief from intestinal colic [5, 26].
- In Unani medicine, Habb-ul-Ghar (*Laurus nobilis* L.) is traditionally administered orally in the form of a linctus prepared with honey. This preparation is employed for its therapeutic efficacy in managing respiratory conditions such as dyspnoea, chronic cough, pulmonary ulcers, and phlegmatic disorders of the chest [5, 26, 27].
- According to classical Unani texts, *Habb-ul-Ghar*, when finely ground and mixed with either *Roghan Gul* or vinegar, is topically administered to the ear to provide therapeutic relief from *Ṭanīn-o-Dawī* (Tinnitus), *Waja 'al-Udhun* (Otalgia), and *Ṭarash* (Impaired hearing) [5, 31, 18, 26].
- Traditional Unani practice suggests that gargling with a decoction of *Habb-ul-Ghar* is effective in reducing *Waja 'al-Asnān* (Toothache), likely due to its local analgesic and anti-inflammatory properties [28, 32].
- Oral administration of *Laurus nobilis* L. in doses ranging from 4.5 to 9 grams, when combined with fermented preparations such as wine, has been traditionally indicated for the management of lower urinary tract dysfunctions, including *Salas al-Bawl* (Urinary incontinence) and *Taqṭīr al-Bawl* (Dribbling of urine) [5, 26]. Additionally, this formulation is reputed to facilitate uterine contractions during parturition and exert emmenagogic effects by promoting menstrual flow, suggesting its potential action on smooth muscle modulation and hormonal regulation [25, 26].
- The oral intake of *Habb-ul-Ghar* (*Laurus nobilis* L.) in a dose of 3.5 grams, administered with water, has been traditionally utilized for its lithotriptic action, which may assist in the fragmentation and elimination of urinary calculi [5, 31, 18, 25, 26].
- According to *Dawood Antaki*, *Habb-ul-Ghar* demonstrates therapeutic efficacy in the management of disorders associated with a hot temperament, particularly when administered with *Sikanjabīn* (a traditional formulation comprising vinegar and either honey or sugar). In contrast, when taken with honey alone, it is considered effective for conditions linked to a cold temperament. *Antaki* further advocated for its external applications, including its use as an *Ābzan* (Sitz bath) for rectal and uterine pathologies, as a *Naṭūl* (Irrigation) for its resolvent properties, and as a *Firzaja* (Pessary) to induce abortion and facilitate diuresis [27].

- The *Roghan* (Oil) extracted from *Habb-ul-Ghar*, recognized as one of the innovations attributed to the renowned physician *Hakeem Dioscorides*, continues to be utilized in parts of Southern Europe for its properties as a nerve stimulant [5].
- The *Roghan* (Oil) of *Habb-ul-Ghar* has been traditionally used topically for a range of conditions, including *Dā'al-Tha 'lab* (Alopecia areata), *Qūbā* (Ringworm), *Qatil-i-qaml* (Lice infestation), *Jarab* (Scabies), *Ḥikka* (Pruritus), *Waja 'al-Mafāṣil* (Polyarthritis), *Niqris* (Gout), *Waja 'al-Ẓahr* (Backache), Waja *'al-āsāb (*Neuralgia), *Laqwa* (Facial palsy), *Fālij* (Hemiplegia), and Waja *'al-Kabid* (Hepatic pain). It is also valued for its muscle-strengthening effects and is considered beneficial in alleviating *Awrām Balghamiyya* (Phlegmatic inflammation) and *Nafkh al-Shikam* (Intestinal flatulence), highlighting its anti-inflammatory, analgesic, antiparasitic, and tonic properties within traditional medicine systems [33].

Dose (*Miqdār-i-Khurak*):

According to *Khazian-ul-Advia* and M*uhit-e-Azam*, the prescribed dose ranges from 2.15 g to 9 g. In contrast, *Bustan-ul-Mufaridat* reports a slightly higher minimum dose of 3 g, maintaining the same upper limit of 9 g. However, *Makhzan-ul-Mufaridat* suggests a significantly lower fixed dose of 2 g. This variability in dosage highlights the need for further pharmacological evaluation to establish a standardized therapeutic range based on contemporary safety and efficacy profiles.

Adverse effects (*Muẓir*):

There are powerful emetic characteristics in *Habb-ul-Ghar* that cause vomiting, according to *Ibn Sina*. Excessive or prolonged use may damage the supporting ligaments and gastric musculature, which could lead to *Istirkhā' al-Mi 'da* (Gastroptosis) [5, 18, 26]. He also believed it to be detrimental to the liver [5, 26].

Corrective (*Musleh*):

The corrective (*Musleh*) agents for *Habb-ul-Ghar* vary across classical Unani texts. In *Bustan-ul-Mufaridat*, the correctives are identified as *Kateera* (*Sterculia urens*), *Babool Gond* (*Acacia nilotica*), Behidana (*Cydonia oblonga*), and *Tabasheer* (*Bambusa arundinacea*). In contrast, *Khazian-ul-Advia* and *Muhit Azam* recommend *Zarishk* (*Berberis vulgaris*) as the corrective. This variation reflects differing traditional perspectives on temperamental balance and mitigation of adverse effects.

Substitute (*Badal*):

The concept of *Abdāl-i-Adwiya* (drug substitution) in Unani medicine is based on selecting alternative drugs with similar pharmacological actions and temperaments. Galen, in *Al-Adwiyat al-Muqābila lil-Adwiyā*, highlights the use of lower-quality substitutes when superior drugs are unavailable, noting their relatively lower risk. For effective drug substitution, a systematic comparison of the substitute and original drug in terms of their temperament and pharmacological correspondence is essential.

In *Muhit-e-Azam* and *Khazain-ul-Advia*, the recommended substitute is *Hab-ul-Mahalab*. However, in case it is not available, *Badam Talakh* (*Prunus dulcis*) may be used as a substitute. In addition to

corrective agents, *Bustan-ul-Mufaridat* also lists *Sazaj Hindi* (*Cinnamomum tamala*) and *Shuniz* (*Nigella sativa*) as substitutes (*Badal*) for Habb-ul-Ghar.

Important Formulations (*Mashhoor Murakkabat*):[34, 35, 36]

- *Tiryāq-i-Arb'a*
- *Tiryāq-i-samāniya*
- *Tiryāq-i-Fārūq*
- *Tiryāq-ut-teen*
- *Tiryāq-e-Aqrab*
- *Anqaruya-e-kabeer*
- *Dawa-ul-Kibrit*

Phytochemical Overview of *Laurus nobilis* L.:

Laurus nobilis L. fruits have been reported to contain a diverse array of phytoconstituents, including phenolic compounds, flavonoids, glycosides, steroids, essential and fixed oils, tannins, resins, carbohydrates, and proteins. In addition, they are a source of inorganic elements such as iron, calcium, sodium, potassium, and phosphate [37]. Phytochemical constituents are listed below in table form:

Table 1

S. No.	Phytochemical Constituents	Contents
1.	Phenolic Acid[15, 38, 39]	Vanillic acid, Caffeic acid, Syringic acid, Ferulic acid, Cinnamic acid/ methyl cinnamate, Rosmarinic acid, Chlorogenic acid, Sinapic acid, 3,4-Dihydroxy benzoic acid, 2-Hydroxy benzoic acid, Gallic acid, p-Coumaric acid
2.	Flavonoids[38, 39, 40]	Cynidin-3-O-glucoside, Cynidin-3-O-rutisonide, Peonidine-3-O-glucoside, 3-O-rutisonide peonidine, Kaempferol, Quercetin, Apigenin, Luteolin.
3.	Essential Oils[38, 41]	1,8-cineole, α-phellandrene, β-pinene, α-pinene, α-terpinyl acetate, sabinene, camphene, germacrene D, and β-caryophyllene.
4.	Fatty Acid	Caprylic acid, Capric acid, Lauric acid, Tridecanoic acid, Myristic acid, Myristoleic acid, Pentadecanoic acid, Palmitic acid, Palmitoleic acid, Margaric acid, Stearic acid, Oleic acid, 2n-6 Linoleic acid, 3n-3 Linolenic acid, Arachidic acid, Eicosanoic acid, Behenic acid.
5.	Tocopherol [38, 42]	α-Tocopherol, β-Tocopherol, γ-Tocopherol
6.	Sterol[38]	Cholesterol, Campesterol, Stigmasterol, β-Sitosterol, Δ5-Avenasterol.
7.	Carotenoids[43]	β-carotene, Lutein and Neoxanthin

The Functional Role of Bioactive Constituents in *Laurus nobilis L.*:

Phenolic compounds:

Laurus nobilis L. (bay leaves) is a rich source of phenolic compounds such as flavones and flavanols, which play a key role in its antioxidant capacity [44]. The presence of hydroxyl groups in these molecules contributes to their ability to scavenge free radicals, thereby reducing oxidative stress [45]. Owing to these properties, phenolic compounds from plants are increasingly utilized in the food industry for their ability to inhibit lipid oxidation, enhance nutritional value, and exert antimicrobial effects [46,

47]. *L. nobilis* L. contains a wide range of phenolic classes, including flavonoids, phenolic acids, proanthocyanidins, and lignans, which collectively contribute to its biological activity [48,49].

Flavonoids:

Flavonoids are a diverse group of naturally occurring polyphenolic compounds that serve as pigments responsible for the yellow, orange, and red coloration in various plant parts [50]. As polyphenols, their antioxidant activity is closely associated with the number and position of hydroxyl groups, which facilitate hydrogen atom transfer and free radical scavenging. These compounds are among the most effective natural antioxidants and are well-documented for their broad spectrum of biological activities, including antibacterial, antiviral, anti-inflammatory, anticancer, and antiallergic effects [51, 52, 53]. In *Laurus nobilis* L., flavonoids represent the predominant class of phenolic compounds, with flavones and flavonols being the most abundant. Notable flavonoid constituents commonly identified in bay leaf extracts include apigenin, kaempferol, quercetin, and their glycoside derivatives [49, 54].

Essential Oils:

The essential oil of *Laurus nobilis* L. is characterized by a high concentration of 1,8-cineole, which is typically the dominant component. Other significant constituents include α-pinene, β-pinene, sabinene, limonene, and linalool [44]. In addition to leaves, other plant parts have been investigated for their volatile profiles, revealing the presence of aromatic compounds such as eugenol, methyl-eugenol, and elemicin—ranging from 1% to 12%—which contribute to the characteristic spicy aroma of bay leaves and serve as quality markers. The essential oil also demonstrates potential as a natural preservative, with applications in food preservation, including the stabilization of edible oils [49, 55].

Tocopherol:

Tocopherols are fat-soluble compounds recognized for their vitamin E activity and antioxidant properties, playing a key role in protecting cells against oxidative stress. Naturally occurring in many plant sources, they exist in four main forms: α-, β-, γ-, and δ-tocopherol. In bay plants, the distribution of these isoforms varies between organs; α- and γ-tocopherols are predominantly found in the leaves, whereas β-tocopherol is more abundant in the seeds. Among all forms, δ-tocopherol is present in the lowest concentration in both leaves and seeds [56].

Fatty Acid:

The fatty acids present in *Laurus nobilis* L. plays a significant role in determining the plant's nutritional, medicinal, and industrial value. Its seed oil is particularly rich in lauric acid, along with notable amounts of oleic and linoleic acids. Lauric acid, known for its antimicrobial and anti-inflammatory effects, contributes to the therapeutic potential of bay laurel oil. Oleic and linoleic acids, essential unsaturated fatty acids, support cardiovascular and skin health, enhance the oil's oxidative stability, and offer emollient properties beneficial in cosmetic formulations. The balanced composition of saturated and unsaturated fatty acids not only underlies the traditional uses of *L. nobilis* L.in folk medicine but also highlights its potential in modern nutraceuticals and skincare products [56].

Evidence based pharmacological actions:

Effect of *Laurus nobilis* L. in Alzheimer's Disease (Anti-Acetylcholinesterase Activity):

Acetylcholinesterase (AChE) plays a crucial role in the pathology of several neurodegenerative disorders, particularly Alzheimer's disease (AD). Its primary function is to catalyse the breakdown of acetylcholine (ACh) into choline, and a reduction in ACh levels is closely associated with the cognitive decline observed in AD. As such, AChE has emerged as a key therapeutic target. The inhibition of cholinesterase activity within the central nervous system represents a widely adopted strategy for managing cognitive impairments linked to AD, as well as other neurological conditions including senile dementia, Parkinson's disease (PD), myasthenia gravis, ataxia, and glaucoma (57). Accumulating evidence highlights the role of acetylcholinesterase inhibitors in counteracting cholinergic decline and enhancing neurotransmitter activity in Alzheimer's disease. The acetylcholinesterase-inhibitory activity of bay laurel essential oil (LNEO) was evaluated in comparison with rivastigmine, a standard reference compound (58). Studies evaluating the anticholinergic activity of *Laurus nobilis* L. have reported notable acetylcholinesterase (AChE) inhibitory effects in various extracts. The essential oil (LNEO) demonstrated over 50% inhibition, while the ethanolic extract exhibited even greater potency, reaching 64%. These findings support the potential of *L. nobilis* L. as a natural source of cholinesterase inhibitors, with demonstrated efficacy in both in vitro and in vivo models and a favourable safety profile [59].

Effect of *Laurus nobilis* L. in Parkinson's Disease:

Spirafolide, a sesquiterpene lactone isolated from *Laurus nobilis* L. leaves, has demonstrated neuroprotective effects by reducing ethanol-induced blood levels, nitric oxide (NO) production, reactive oxygen species (ROS) generation, and dopamine-mediated apoptosis in rats. These findings suggest its potential as a therapeutic candidate for neurodegenerative disorders [60]. Reynosin, a sesquiterpene lactone isolated from *Laurus nobilis* L. leaves, has demonstrated neuroprotective effects by reducing nitric oxide production and blood ethanol levels. In a dopamine toxicity model, Reynosin modulated key regulatory proteins by downregulating α-synuclein and upregulating E6-AP, resulting in decreased tyrosine hydroxylase-positive neuronal loss in 6-OHDA-lesioned rats. These findings suggest Reynosin as a promising candidate for the treatment of neurodegenerative disorders, particularly Parkinson's disease [61].

Effect of *Laurus nobilis* L. in other Neurological Conditions:

The essential oil of *Laurus nobilis* L. (LNEO) has shown protective effects against pentylenetetrazol (PTZ)-induced seizures, supporting its traditional use as an antiepileptic agent. However, its anticonvulsant doses were associated with sedation and motor impairment, likely due to the presence of monoterpenes such as eucalyptol, eugenol, methyl-eugenol, sabinene, terpineol, and pinene. These constituents have demonstrated central nervous system effects, including muscle relaxation and locomotor suppression, which may contribute to the observed pharmacological activity. Further research is needed to clarify the active compounds and mechanisms underlying its anticonvulsant properties [62].

Effect of *Laurus nobilis* L. in controlling the Hypertension:

Laurus nobilis L., a medicinal plant traditionally used in Moroccan ethnomedicine for treating hypertension, has demonstrated significant cardiovascular effects in preclinical studies. The aqueous extract of its leaves (AELN) was shown to markedly reduce systolic, diastolic, and mean arterial blood pressure in L-NAME-induced hypertensive rats, with no adverse effects observed in normotensive controls. Ex vivo experiments using isolated rat aortic rings precontracted with epinephrine or potassium chloride revealed a clear, dose-dependent vasorelaxant response. Mechanistically, this effect appears to involve the inhibition of extracellular calcium influx, indicating a possible calcium channel-blocking activity. These results not only validate the traditional use of *L. nobilis* L. in hypertension management but also suggest its potential as a promising natural source for the development of novel antihypertensive therapeutics [63].

Effect of *Laurus nobilis* L. in Wound Healing:

The findings from the study on *Laurus nobilis* L. leaf extract demonstrate its significant efficacy in enhancing wound healing, particularly at an oral dose of 200 mg/kg administered once daily in rabbits with experimentally induced open wounds. The extract's therapeutic effects are attributed to its rich composition of bioactive compounds, including flavonoids, monoterpenoids, and essential oils, which collectively exert antimicrobial, anti-inflammatory, antioxidant, and tissue-regenerative actions. These properties contribute to reduced infection, minimized inflammation, enhanced collagen synthesis, stimulated cell proliferation, and improved angiogenesis—all critical factors in accelerating the wound healing process. Overall, the evidence supports the traditional use of *L. nobilis* L. in wound care and highlights its potential as a natural and effective therapeutic agent for the management of skin injuries and tissue repair [64].

Effect of *Laurus nobilis* L. leaf extract as Antidiabetic:

Preclinical studies have shown that *Laurus nobilis* L. leaf extract (LNLE) exhibits significant antidiabetic activity in streptozotocin-induced diabetic rat models. Treatment with LNLE led to a marked reduction in blood glucose levels, likely through the stimulation of insulin secretion from residual pancreatic β-cells, with effects comparable to the standard drug acarbose. Additionally, LNLE ameliorated histopathological damage in the liver and pancreas and normalized altered biochemical markers, including hepatic enzymes (ALT, AST, GGT), renal function indicators (urea, creatinine), and serum levels of total protein, calcium, and iron. These findings highlight the therapeutic potential of *L. nobilis* L. as a natural agent for diabetes management and metabolic organ protection [65].

Therapeutic Role of *Laurus nobilis* L. Essential Oil in Nanoformulations for Cancer Treatment:

The development of *Laurus nobilis* L. essential oil-loaded poly lactic-co-glycolic acid (PLGA) nanoparticles (LNEO-NPs) represent a significant advancement in the design of phytochemical-based nanocarriers for cancer therapy. The nanoparticles demonstrated desirable physicochemical properties, including narrow size distribution, stable zeta potential, and efficient encapsulation, which are critical for drug delivery applications. In vitro release studies confirmed a sustained release profile, enhancing the therapeutic potential of LNEO. Furthermore, interaction studies with CT-DNA suggested a possible

intercalative binding mechanism, while molecular docking analyses indicated that bioactive constituents of LNEO exhibit strong binding affinities to the PI3K/mTOR signalling pathway, a critical target in oncogenesis. The favourable ADME characteristics of the LNEO components further support their potential as drug candidates. Collectively, these findings highlight the utility of LNEO-NPs as a promising nanoplatform for targeted and controlled anticancer therapy, warranting further in vivo investigation and clinical validation [66].

Anti-Inflammatory Mechanisms of *Laurus nobilis* L.: Targeting the NLRP3 Inflammasome:

Emerging evidence suggests that *Laurus nobilis* L. leaf extract has notable anti-inflammatory properties, primarily through its ability to interfere with NLRP3 inflammasome signalling pathways. Investigations in murine bone marrow-derived macrophages revealed that the extract suppresses crucial steps of inflammasome activation, including the processing of caspase-1, release of interleukin-1β, and the formation of ASC pyroptosomes. These effects appear to be largely mediated by 1,8-cineole, the dominant constituent of the extract. Additionally, the extract demonstrated protective effects in a mouse model of acute lung injury by reducing the expression of inflammatory cytokines. Collectively, these findings indicate that *L. nobilis* L. leaf extract may regulate immune responses by targeting inflammasome activity, suggesting its potential for therapeutic application in inflammation-related conditions [67].

***Laurus nobilis* L. as a Natural Antiviral: Insights from In Vitro Studies:**

The essential oil of *Laurus nobilis* L. fruit has been investigated for its antiviral properties using in vitro tests that target HSV-1 and SARS-CoV. Based on the reduction of virus-induced cytopathic effects after infection, the inhibitory effects were evaluated in these investigations. The oil's selectivity index (SI) was 4.2, and its IC50 was 120 mg/mL, indicating moderate antiviral efficacy against SARS-CoV. Stronger inhibition of viral replication was shown by the notable improvement in efficacy against HSV-1, where the IC50 was lowered to 60 mg/mL [68].

***Laurus nobilis* L. as a Natural Antimicrobial Agent:**

The ethanolic crude extract of *Laurus nobilis* L. fruit was assessed for antimicrobial efficacy against a panel of microorganisms, including four Gram-positive (e.g. *Staphylococcus aureus*, MRSA, *Bacillus subtilis*, and *Bacillus cereus*) and five Gram-negative bacteria (*Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella typhimurium*, *Chromobacterium violaceum*, and *Pseudomonas aeruginosa*), as well as four fungal strains (*Aspergillus fumigatus*, *A. niger*, *Candida albicans*, and *C. glabrata*) using the agar diffusion assay. The extract demonstrated moderate inhibitory activity across all tested microbial strains. In addition, anti-quorum sensing potential was evaluated using *Chromobacterium violaceum* at a dose of 3 mg/disc, with tetracycline as the reference standard. The inhibition zone for quorum sensing was recorded as 15 ± 0.9 mm [69].

Conclusion:

Laurus nobilis L., commonly known as *Habb-ul-Ghar* in Unani medicine, is a botanically and pharmacologically significant evergreen shrub of the Lauraceae family. Traditionally, it has been utilized for a wide range of therapeutic purposes, particularly for its anti-dotal and protective properties. In Unani literature, it is credited with numerous pharmacological actions, including *Tiryāq-e-Sumoom* (Antidote), *Musakkin-i-Alam* (Analgesic), *Muḥallil* (Resolvent), *Muḥarrik-i-A ʻṣāb* (Nervine stimulant), *Muqawwi-i-Ḥafiẓa* (Memory tonic), *Muddir-i-Bawl* (Diuretic), *Muddir-i-Ḥayḍ* (Emmenagogue), *Dāfi ʻ-i- Su ʻā*l (Anti-tussive), *Mufattiḥ Sang Mathāna* (Lithotriptic), *Dāfi ʻ-i-Tashannuj* (Antispasmodic), *Mudammil* (Healing agent), *Musqiṭ-i-janīn* (Abortifacient), *Mufarriḥ* (Refrigerant), *Musakkin* (Sedative) and *Kāsir-i-Riyāḥ* (Carminative). Modern scientific investigations support many of these traditional claims, with emerging evidence demonstrating its neuroprotective, antihypertensive, antidiabetic, anti-inflammatory, wound-healing, antimicrobial, and antiviral activities. Furthermore, the integration of *Laurus nobilis L.* extracts into Nano-formulations for cancer therapy underscores its growing relevance in contemporary biomedical research. Rich in bioactive constituents such as phenolic compounds, flavonoids, essential and fixed oils, glycosides, and minerals, *L. nobilis* L. presents a multifaceted therapeutic profile. Turkey contributing approximately 97% of global production, this aromatic species continues to serve both traditional systems like Unani and modern pharmacological applications. Future research should aim to elucidate its mechanisms of action and optimize its use in evidence-based clinical practice.

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