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Therapeutic potential of quince in Tibbe-e-Nabwi: A review of traditional and modern perspectives

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Abstract
The Quince known as safarjal belong to the Rosaceae family and are also known as *Cydonia oblonga* Miller, *Cydonia maliformis* Miller and *Pyrus cydonia* L. This deciduous tree produces vivid golden-yellow, pear-like pome fruit when it reaches maturity. Nearly every part of it, including the fruit, leaves, bark, seeds, and buds, is used medicinally. The glycoside amygdalin, tannin, mucilage, ash, and fatty oil are all present in the seed kernel. Hydrocyanic acid is produced by bark and shoots, while buds contain a cyanogenetic glycoside. The uses of quince in Tibb-e-Nabwi emphasize its roles as an aphrodisiac, nephroprotective, anti-inflammatory, anti-cancer, anti-allergic, anti-atherosclerotic, antibacterial, antihypertensive, hepatoprotective, anti-microbial, antispasmodic and anti-inflammatory. hypolipidaemic, hepatoprotective, antimicrobial, antispasmodic, anti- inflammatory and anti-cancer. Talha bin Ubaid Ullah Radi Allaho Anh narrated that I went to Rasullullah Sallallaho Alaihe Wasallam & he had a QUINCE in his hand, Prophet Muhammad Sallallaho Alaihe Wasallam said to me: "Take it O Aba Zar, this (Quince) makes the heart strengthen, makes the breath pleasant and relieves (removes) the burden of the chest". The quince is praised for its fragrance and taste in the Hadith literature. Quince is said to eaten on empty stomach it is good for the soul. The best way to eat the quince is boiled or cooked in honey. Quince is associated with themes of abundance, sustenance, and blessings. In Hadiths, the quince is referenced as a fruit of Paradise, emphasizing its spiritual significance. The goal of the current review is to integrate the efforts made to explore the Knowledge and Comprehensively Highlights the diverse effects that the herb *Cydonia oblonga* has in the human body.

Keywords: *Cydonia oblonga*, chemical constituents, great advantages, medicinal properties

Introduction
Quince (*Cydonia oblonga*), is a plant having many medicinal properties. Quince (*Cydonia oblonga*) is known with different names, Urdu name “Bahee Dana”, Farsi name “Beh”, Greek name “Strythion”, and Hindi name “Bihi” belonging to Rosaceae family & safarjal (Arabic) is official in Tib-e-Nabvi and is mentioned in the Holy Quran. It is a small deciduous tree that bears pome fruit, similar in appearance to a pear and bright golden-yellow when mature [1]. Many plants have been known to produce biologically active substances, some of which are related to special flavour or taste and others are found to be useful as antioxidants, and/or antimicrobial agents [2]. Most varieties of quince are sour to eat and are used to Make jam, jelly and quince pudding, or they may be peeled, then roasted, baked or stewed. Originating from "marmelo," the Portuguese word for this fruit, the word "marmalade" originally referred to a quince jam. In Iran, quince, called beh (بِه), is used raw or in stews and some regional soups. It is also made into jam or preserve. An energizing summer beverage can be created by combining cool water with a few lime drops with the surplus syrup from the jam-making process. It can also be found pickled [3]. The global demand for herbal medicinal products has increased significantly in recent years. It is estimated that, the world’s population will be more than 7.5 billion in the next 10 to 15 years [4].

Origin & distribution
Cydonia oblonga belongs to the Rosaceae family and is a shrub or small tree in the Asian genera Chaenomeles and Cydonia. It is a spineless tree with edible fruits cultivated from ancient times in Asia and in the Mediterranean area [5, 6]. Quince fruit (*Cydonia oblonga* Mill) in terms of taxonomy belongs to the genus Cydonia and the Rosaceae family. This species

comes from Asia Minor. The fruits are big hairy and pear-shaped or apple-shaped, yellow color with typical flavor and aroma [7] the fruits are globular Oblonga or pear-shaped in form with a rich yellow and orange colour when ripe, a strong flavor, and a strange yet appealing aroma. The seeds are highly prized as a calming tonic and are widely used medicinally. The leaves are roughly 10 cm long and 5 cm wide, with an ovate to oblong shape. Quince has hermaphroditic flowers. The solitary white flowers are 4–5 cm across, have 5 petals, 20 or more stamens, 5 styles, an inferior ovary with many ovules, and are borne on current season growth. Stamens are composed of a large number of filaments and light-yellow anthers, which are arranged in three circular rows. The blooming season coincides with the apple harvest, typically starting in mid-April in the northern hemisphere's central latitudes [8]. Fruiting and flowering occur from August to September [9].

Medicinal properties

Quince (*Cydonia oblonga*) has conventionally been used as medicinal agent [10]. Quince fruit has many benefits for human health and is regarded to be a health- promoting fruit [11]. Fruits are edible [12] and they have properties of astringent, expectorant and cardiac tonic [13, 14]. Unripe fruit is the great astringency makes it useful as a remedy for diarrhoea, one that is safe for children. Fruit and its juice can also be taken as a mouthwash as gargle to treat mouth ulcers, gum problems and sore throats [15]. Seeds are used in diarrhoea, dysentery, sore throat and fever [13, 14]. Seeds are mucilaginous, and have a property of demulcent [16]. Seeds contain significant quantities of mucilage and are helpful both in treating bronchitis and as a bulk laxative [15].

Leaves, buds and bark are astringent [13, 14]. The phenolic extracts from leaves of *Cydonia oblonga* can be used as a better and cheaper source of bioactive compounds and may have relevance in the prevention of diseases in which free radicals are implicated [17]. The leaves of *Cydonia oblonga* has been utilized in traditional medicine as antitussive, antipyretic, sedative and antidiarrheic properties [17]. The phenolic extract of the quince leaf has properties of free-radical scavenging and anti haemolytic activities [2]. The polyphenolic extracts of fruit from *Cydonia oblonga* has been proved that it has antioxidant, antimicrobial (Antibacterial and anti- influenza viral), and anti-ulcerative properties [17].

Chemical constituents

Quince fruits' primary nutritional contents in 100 g fresh weight were: 176 kg of energy, 0.6 g of protein, 0.9 g of acid, 9.1 g of carbohydrates, 86.9 g of water, 0.6 g of ash, and 1.9 g of fiber. Mineral element contents in 100 g quince fruits were: Na 9.2 mg, K 189 mg, Ca 66 mg, Mg 10 mg, Fe 1.1 mg, P 25 mg, Cu 0.006 mg, Zn 0.013 mg, and Mn 0.002 mg. The vitamin contents in 100 g fresh quince fruit were: retinol: 5.5 µg, carotene 0.03 mg, thiamine: 30 µg, riboflavin: 30 µg, niacin: 0.2 mg and ascorbic acid: 13 mg [18, 19] Fruit juice contain thiamine, riboflavin, nicotinic acid, vitamin B6, inositol, pantothenic acid, folic acid and biotin [20]. Seed kernel contains glycoside amygdalin [13, 19], tannin, mucilage (About 22%), ash (1.3%) and fatty oil (14-19%) [20] buds contains a cyanogenetic glycoside; bark and shoots yield hydrocyanic acid [13, 19] and distillation [20]. The analysis of the essential oils of *Cydonia oblonga* leaves showed that the leaves of *Cydonia oblonga* contained aromatic aldehyde [benzaldehyde (12.8%)], followed by fatty acid [Hexadecanoic acid (7.2%)], oxygenated monoterpene [Linalool (5.7%)], norisoprenoid [(E)-β-Ionone (5.1%)], sesquiterpene hydrocarbon[germacrene D (8.6%)] and aromatic aldehyde [benzaldehyde (4.9%) [20].

Pharmacological effects of *Cydonia oblonga*

Antioxidant effect

The antioxidant functions of quince phenolic extracts were superior to that of chlorogenic acid and ascorbic acid, evaluated in both the linoleic acid peroxidation system and the DPPH radical scavenging system [21]. Silva *et al*. (2004) reported the antioxidant activity of quince fruit and jam. They prepared methanolic extracts of quince fruit and jam which were fractionated in to a phenolic fraction and an organic acid fraction then they were analysed by high performance liquid chromatography. The phenolic fraction always exhibited a stronger antioxidant activity that the whole methanolic extract. The antiradical activity of organic acid extracts was consistently the lowest, suggesting that the phenolic fraction contributes more to the antioxidant capacity of quince fruit and jam [22].

Aphrodisiac effect

The aphrodisiac potential of *Cydonia oblonga* may be due to its secondary metabolites such as flavonoids, glycosides, tannins, and phenolic compounds present in the extract [23]. Hypercholesterolemia has been linked to male testicular dysfunction, it is known to have detrimental consequences on male reproductive function. Cholesterol-fed animals treated with quince leaf decoction supplement exhibited that quince leaf has a protective effect on the testes [24].

Effect on git

The effect of Quince Juice (QJ) and Quince Hydroalcoholic Extract (QHE) on Ulcerative Colitis (UC) induced by TNBS (trinitrobenzene sulfonic acid) was studied in rats. Rats were grouped and fasted for 36 hr before colitisinduction. TNBS was instilled into the colon with a hydroalcoholic carrier and then treated for 5 days starting 6h after colitis induction with different doses of QJ (200, 400, 800 mg/kg), QHE (200, 500 & 800 mg/kg) orally, QJ (400 mg/kg) and QHE (200 and 500 mg/kg) intraperitoneally. The colon tissue was extracted, and following macroscopic and histopathologic evaluations, the tissue damage was scored. The examined doses of QJ and QHE were effective to reduce the extent of UC lesions, only the greatest doses (500 and 800 mg/kg) resulted in the medical importance of *Cydonia oblonga*- A review significant alleviation. Treatment with quince also reduced the weight/length ratio, which is a good indicator of extravasation and tissue inflammation [25]. Preparations of *Cydonia oblonga* fruit suppressed castor oil-induced diarrhea in rats and decreased their gastrointestinal motility [26].

Cardiovascular effects

Khademi *et al*. examined how atorvastatin and quince leaf extract compared in terms of their effects on atherosclerosis. The findings showed that quince leaf has lipid-lowering properties similar to those of atorvastatin, and it may be a novel natural product for the treatment of atherosclerosis [27]. The effect of ethanol leaf extracts of *Cydonia oblonga* Mill. (COM) was studied on hypertension and on biomarkers associated with blood pressure control, such as

Angiotensin-II (AII), Plasma Renin Activity (PRA), apelin-12 (A), Endothelin (ET) and Nitric Oxide (NO), in contrast to captopril. Six groups were randomly assigned to two-kidney, one-clip (2K1C) Goldblatt model rats: sham, model, captopril 25 mg/kg, and COM leaf extract 80, 160, and 320 mg/kg. The medication was taken orally every day for eight weeks. Blood pressure measurements were taken before starting treatment and every two weeks to determine the diastolic and systolic pressures. Blood and kidney samples were collected after the last treatment to measure AII, PRA, A, ET and NO. Renal Hypertensive Rats (RHR) had increased blood pressure, AII, A, PRA, ET and decreased NO. Treatment with captopril reduced blood pressure, AII, A, PRA, and ET, though not quite to normal values. COM leaf extracts substantially and dose-dependently lowered blood pressure, AII, A, RA, and ET, but raised NO. The effects of COM extracts on blood pressure and biomarkers were dose-dependent and at the highest dose, it produced effects similar to those of captopril [28].

Immunilogical and anti-allergic effects

The immunomodulatory and antiallergic effect of lemon, Citrus medica, and *Cydonia oblonga*, which were used in pharmaceutical products to treat patients suffering from allergic disorders, were investigated. Preparations were evaluated for their effect on basophilic cell degranulation and mediator release from activated human mast cells *in vitro*, including IL-8 and TNF-α production. The results showed that the degranulation of basophilic cells was diminished only in the presence of Citrus, and this effect was compared to the synthetic drug azelastine. Furthermore, Citrus and Cydonia reduced IL-8 and TNF-α production in human mast cells, with additive effects at low doses [29]. In Europe, *Cydonia oblonga* extract along with lemon juice is one of the popular complementary therapies used for alergic rhinits and asthma [30].

Reproductive effect

The effect of quince (*Cydonia oblonga* Miller) leaf decoction was evaluated in testicular injury and impaired spermatogenesis induced by hypercholesterolemia in rabbits. Mature male New Zealand white rabbits were randomly assigned to three groups: group 1 (Hypercholesterolemia), group 2 (Hypercholesterolemia with quince therapy), and group 3 (Control). Groups 1 and 2 were fed a cholesterol-rich diet for six weeks. Group 2 received *Cydonia oblonga* leaf decoction as drinking supplement as well. After six weeks, a normal diet was substituted in groups 1 and 2 for another six weeks. Group 3 (Control group) was maintained on a regular diet throughout the study. At the end of the 12th week, the left testes of the animals were resected for light microscopic study for evaluation of the maturity of germ cells in seminiferous tubules using Johnsen's score. All rabbits in group 1 showed increased intertubular connective tissue and vessel diameter, as well as abundant spermatogonia and primary spermatocytes along the reduced germinal epithelium. The animals in groups 2 and 3 had no significant changes in their testicular sections. The mean Johnsen's score of group 1 (4.20±1.92) was significantly lower than that of group 2 (7.33±0.52) and group 3 (7.05±0.07). (p=0.01). According to the results, authors concluded that quince leaf decoction (*Cydonia oblonga*) protected rabbit testes and spermatogenesis from damage induced by hypercholesterolemia [31].

Anti-inflammatory effect

The anti-inflammatory effect of polyphenolic extract from the Tunisian quince *Cydonia oblonga* Miller was investigated. The stimulation of human THP-1-derived macrophages with Lipopolysaccharide (LPS) increased the release of pro-inflammatory cytokines TNF-α and IL-8. Quince peel polyphenolic extract suppressed these alterations in a dose-dependent manner. Concomitantly, quince polyphenols enhanced the level of the anti-inflammatory cytokine IL-10 as well as IL-6 secreted by LPS-treated macrophages. The increase in IL-6 secretion that occurred when quince polyphenols were associated with LPS treatment was partially responsible for the polyphenols-mediated inhibition of TNF-α secretion. Biochemical investigation revealed that quince polyphenols extract reduced LPS-mediated activation of three key cellular pro-inflammatory effectors: NF-κB, p38MAPK, and Akt [32].

Anti spasmodic effect

Janbaz *et al*. (2013) [33] Evaluated the antispasmodic activity of methanolic extract of *Cydonia oblonga* seeds in gut and airways diseases. Rabbits (1000-1500 g) and Guinea-pigs (500-600 g) of both sexes and local breed were kept, and maintained at standard environmental conditions. The animals were given the crude extract of *Cydonia oblonga* seeds and unrestricted access to tap water as usual, but were kept fasting for one day following the commencement of the experiment. The results were compared with the effect of Verapamil as a standard Ca^{++} antagonist. The results demonstrated that the crude extract of *Cydonia oblonga* seeds induced atropine sensitive spasmodic effects in isolated ileum of guinea pig and rabbit jejunum preparations. They concluded as the mild spasmodic property of the *Cydonia oblonga* seed extract is caused by the activation of muscarinic receptors, while Ca^{++} antagonist mechanism is possibly responsible for antispasmodic effects observed in gastrointestinal and tracheal tissues [33, 34, 35, 36].

Conclusion

This review discusses the great prospects and potential of quinces. It has been studied that it is a very important plant and has been used since ancient times to treat several diseases in traditional medicine. Experimental studies have shown it as an antioxidant, aphrodisiac, hepatoprotective, hypotensive and hypolipidemic, anti-allergic, anti-inflammatory agent, antibacterial and antispasmodic properties.

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