REVIEW ARTICLE

Medicinally Active Spices and Condiments in Unani Medicine: A Coherent Review

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Abstract

Introduction: Spices and condiments are highly effective as medicine, easily available, low in cost and can be a source from kitchen to clinic, if utilized in a proper scientific way. Unani medicine uses spices and condiments since ancient times as classical literature is enriched with data defining medicinal benefits of spices. The work, not explored earlier, has two basic aims, first to scrutinize the potent as well as common spices and condiments endowed with health benefits mostly used by Unani physicians for the treatment of several disorders and second, to compile the relevant information in a logical scientific manner. **Materials and Methods:** A methodical study of the Unani literature was done from available relevant ancient classical data especially pharmacognosy and pharmacology textbooks. Critical assessment was carried out from Unani classical books such as *Al Qanoon Fit Tib*, *Khazain al-Advia*, *Makhzan al-Advia*, *Kitab al-Hawi*, *Al-Jami li Mufradat al- Advia wa'l Aghziya* as well as from *The Unani Pharmacopoeia of India*. Recent studies pertaining pharmacological activities of various spices were included and cited from varied research articles and databases such as Science-Direct, Wiley Online Library, and PubMed. **Results and Discussion:** Phytochemical screening of spices revealed numerous active biomolecules such as phenolic compounds, essential oil, and flavonoids known to possess medicinal value such as carminative, anti-inflammatory, analgesic, anti-oxidant, purgative, laxative, antiviral, expectorant, and diuretic activities. Furthermore, pharmacological analysis utilizing different assays exposed significant information about its important usage as antioxidant, anti-inflammatory, anticarcinogenic, hypolipidemic, antiviral, antihypertensive and many more activities in illnesses relating neurological, respiratory, gastric and hepatic disorders, etc. **Conclusion:** In the present study, we discuss various medicinally active spices used in Unani medicine with their chemical composition, traditional uses and supporting research studies. The medicinal aspects of spices and condiments deserve systematic and scientific probe especially identification and evaluation of specific biomarkers to find out best possible therapeutic outcomes. Therefore, from this review, we conclude that medicinally active spices and condiments should be valued and utilized for restoring the health and well-being of individuals along with the treatment of diseases.

Key words: Condiments, Medicinal, Phytochemical, Spices, Unani

INTRODUCTION

Traditional medicines are being considered as leading research topics concerning public health. Unani medicine is a well-established scientific system of medicine that treats the disease with mainly plant-based drugs and gives ample attention to holistic and preventive approach. According to the International Organization for Standardization (ISO), there is no clear-cut division between spices and condiments and as such they have been clubbed together. The term "spices and condiments" applies to "such natural plant or vegetable products or mixtures thereof, in whole or ground form, as are used for imparting flavour, aroma and piquancy to and for seasoning of foods.[1]" Spices and condiments are food seasonings, not distinguished from each other and may be made from seeds, fruits (berries), leaves, bark, blossoms, stems, roots, bulbs, or tubers, etc. They add tang and flavor and have their aromatic effects dispersed in different organs of plants, such as in aril (mace),

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leaves (basil and mint), flowers (clove and turmeric), fruits (peppers and tamarind), roots (turmeric and ginger), twigs or bark of trees (cinnamon and cassia), resin (myrrh), bulbs (leek, garlic and celery) and seeds (ajowan, coriander and aniseed). The consumption of spices in the world has climbed exponentially over the course of the last half-century, with spices such as ginger and chilli pepper being used more often. According to the U.S. National Health and Nutrition Examination Survey, 5–10% of adults in the United States use spices for health benefits and such increased use are because of the lack of side effects, easy availability, and the consideration of known health benefits of spices. In addition to the adult population use, spices use has also been explored in pediatric populations and found that about more than 1/10 of the infants and children were given spices, primarily as remedy for minor ailments such as fussiness or stomach complications, cough, and cold.[2]

Herbs and spices were used by the ancient Egyptians and have been used for centuries in India and China and the first scientific research on the influence of spices as preservative was presented in the 1880s and displayed the antimicrobial effect of cinnamon oil against Bacillus anthracisspores.[3] Many of the spices possess medicinal properties and have a profound effect on human health, since they affect many functional processes. For instance, spices intensify salivary flow and the secretion of amylase, neuraminic acid and hexosamines. They favor the cleansing of the oral cavity from food adhesion and bacteria; they help to check infection and caries, and protect the mucous membrane against thermic, mechanical and chemical irritation. They also increase the secretion of saliva rich in ptyalin which facilitates starch digestion in the stomach, rendering the meals rich in carbohydrates, more digestible. The possible mechanism involved is the activation of the adrenocortical function and fortification of resistance and physical capacity. Stroke volume, blood pressure, and frequency are known to be markedly diminished or augmented by means of spices and they also inhibit thrombus formation and accelerate thrombolysis.[1] Spices and condiments are natural plant products which are mostly used for seasoning and flavoring purposes but have immense medicinal benefits too. They provide a means to boost cuisine to gustatory perfection and contain bioactive molecules that help to prevent serious illnesses such as hypertension and infectious diseases.[4] In one of the clinical trial combined with an experimental study, capsaicin administration enhanced insula and orbitofrontal cortex metabolism in response to high-salt stimuli, thus, the enjoyment of spicy foods significantly reduced individual salt preference, daily salt intake, and blood pressure by modifying the neural processing of salty taste in the brain.[5] In another study, evaluation of the antidiabetic activity of 30 common herbs and spices with inverse virtual screening against 18 known diabetes drug targets were done. The major targets identified were dipeptidyl peptidase-4 (DPP4), intestinal maltase-glucoamylase (MGAM), liver receptor homolog-1 (NR5A2), pancreatic alpha-amylase (AM2A), peroxisome proliferator-activated receptor alpha (PPARA), protein tyrosine phosphatase non-receptor type 9 (PTPN9), and retinol binding protein-4 (RBP4) with over 250 compounds observed to be potential inhibitors of these particular protein targets. Only bay leaves, liquorice and thyme were found to contain compounds that could potentially regulate all 18 protein targets followed by black pepper, cumin, dill, hops and marjoram with 17 protein targets. It was observed that the multi-compound, multi target regulation of the specific protein validated the anti-diabetic potential and cause found was the collective action of more than one bioactive compound regulating and restoring several dysregulated and interconnected diabetic biological processes.[6] Likewise, a comparative clinical study was conducted for ginger, dill seeds, and cumin on thirty-one dysmenorrheic subjects, and dill seed was found effective in reducing pain, followed by ginger wherein cumin did not exhibit any effect. However, cumin exhibited significant reduction in systemic responses such as cold sweats, backache, fatigue, and cramps.[7]

Unani, the traditional medicinal system proposes that food has as much therapeutic value as drugs, as part of the dietary regime and has holistic effects on health. The system has a clear cut two categories of treatment protocols as far as Unani drugs are concerned. The substances, which are primarily, used as diet with more dietary constituents as compared to drug constituents but have some pharmacological activities, and produces its effect through active matter (*Maddā*) and quality (*Kayfiyāt*) is known as *Ghidhā'-i-Dawā'ī* (Dietary drug) such as vinegar, barley, honey etc. On the other hand, the substances, which are used mainly as drug but contain some dietary constituents and produces changes in the body are called as *Dawā' Ghidhā'ī* (Nutritional drug) such as garlic, onion, mint, and spinach.[8] With this scientific explanation, spices and condiments fall under the category of *Dawā' Ghidhā'ī* as evidently defined in Unani medicine. Innumerable spices have been described vastly for their pharmacological actions as antioxidant, carminative, antimicrobial, diuretic, sedative, antiseptic, anthelmintic, stimulant, anti-inflammatory and analgesic, etc., and consistently utilized in Unani medicine for neurological illness such as epilepsy and paralysis, in respiratory disease such as bronchial asthma and pleurisy, in gastric illnesses such as flatulence and indigestion, in hepatic disorders such as ascites and jaundice. The chief bioactive constituent in most of the spices is essential oils, considered as therapeutic agents and is scientifically proven in diverse studies. There are certain methodologies in determining different properties, for example antioxidant activity can be determined by various assays such as DPPH, ABTS, and hydroxyl assays, which are indicated to evaluate the radical scavenging activity and have been usually applied to extracts, essential oils, and isolated organic substances; β-carotene-linoleate model systems and thiobarbituric acid reactive substances assays, which are applied to evaluate foods and organic substances with lipid contents; as well as the ferric antioxidant power reduction, cupric ion reducing antioxidant capacity, and phosphomolybdenum assays, which are used

to evaluate the reducing power of the analyzed compounds, essential oils, cellular antioxidant activity assay as well as inhibition of antioxidant enzymes by analyzing the activity of enzymes that belong to the antioxidant defense system, such as catalase, superoxide dismutase (SOD), glutathione peroxidase, glutathione-S-transferase, and glutathione reductase.[9] There are plentiful reports on the phytochemicals of spices and their beneficial effects on health in cultured cells and animal models but clinical or epidemiological data supporting their chemo preventive potential in human populations are limited, specifically the focus is on antioxidant capacity exerted by chelating metallic ions (especially iron and copper), hydrogen donation, scavenging of free radicals, and by associating with, or acting as, a substrate for radicals (hydroxyl or superoxide) and their ability to act as such is related to the structure of the bioactive compound and the degree of hydroxylation and methylation.[10]

Medicinally Active Spices in Unani Medicine

Spices were used to enhance or vary the flavors, commonly used as flavor disguisers, masking the taste of the tainted food that was still nutritious. Some spices were also used for preserving food like meat for a year or more without refrigeration. In the 16th century, cloves, for instance, were among the spices used to preserve food without refrigeration. Cloves, considered a natural antibiotic, contain eugenol that inhibits the growth of bacteria and is still used to preserve food such as virginia ham. Similarly, mustard and ground mustard were also found to have preservative qualities. When spices were not available, people often went hungry as they could not preserve their food for the winter, thus indicating the economic importance of spices as well.[1]

Ajwain/Bishop's Weed (Trachyspermum ammi (L.) Sprague)

Description

Ajowan belonging to family umbelliferae is an annual erect herb bearing the greyish-brown fruits (seeds), mostly grown in the temperate regions of the world except for a few species which are cultivated in the tropics, especially India and North Africa.

Medicinally Active Constituent

It contains 2.0–4.0% essential oil and fixed oil chiefly constituting thymol, terpene, cymene, carvacrol, and pinene. Others include moisture: 8.9%, protein: 15.4%, fat: 18.1%, fatty acid (petroselinic acid). crude fiber: 11.9%, carbohydrates: 38.6%, mineral matter (total ash): 7.1%, calcium: 1.42%, phosphorous: 0.30%, iron: 14.6 mg/100g, and calorific value per 100 g: 379.4.[1]

Therapeutic benefits

Medicinally, it acts as *Mushtahī* (Appetizer), *Kāsir-i-Riyāḥ* (Carminative), *Dāfi '-i-Tashanuj* (Antispasmodic), *Dāfi '-i-Ta'affun* (Antiseptic). In Unani medicine, it is reported to be useful in *Nafkh-i-Shikam* (Flatulence), *Waja 'al- Mi'da* (Gastralgia), *Ḍu'f-i-Ishtiha* (Anorexia), *Qūlanj* (Colitis), *Shahīqa* (Pertussis), *Ishāl* (Diarrhoea), *Ikhtināq al Rahim* (Hysteria), *Hayḍa* (Cholera)and also, as an enhancer of the body's resistance.[11]

Hilteet/Asafoetida (Ferula foetida L.)

Description

Asafoetida belonging to family umbelliferae is a perennial herb, reddish brown in color, consisting of oleo-gum-resin obtained from rhizomes and roots. It is cultivated in the Mediterranean region and Central Asia in countries such as Persia and Afghanistan. In India, it is cultivated in Kashmir.

Medicinally Active Constituent

Due to the presence of sulfur compounds, it is commonly known as "Devil's dung." The sulfur content in oil varies from 15.3% to 29.0%. It contains 40–64% resin, about 25% gum, 10–17% volatile oil and 1.5–10% ash. Others include active constituents such as asaresinotennol, free or combined with ferulic acid, umbelliferone in combined state, butyl propenyl disulphide, a trisulphide, pinene and terpene.[1]

Therapeutic benefits

Medicinally, it acts as *Moḥarrik-i- A'ṣāb* (Nervine stimulant), *Hāḍim* (Digestive), *Mudirr-i-Bawl* (Diuretics), *Mudirr-i-Ḥayḍ* (Emmenagogue), *Kāsir-i-Riyāḥ* (Carminative), *Dāfi '-i-Ta'affun* (Antiseptic). In Unani medicine, it is reported to be useful in *Ḍu'f-i-Hadm* (Indigestion), *Nafkh-i-Shikam* (Flatulence), *Ḍu'f-i-Mi'da* (Gastric debility), *Nisyān* (Amnesia), *Qillat-i-Bawl* (Anuria), *Fālij* (Hemiplegia) and *Laqwa* (Bell's palsy).[12] Basically, it stimulates the intestinal and respiratory tracts and the nervous system and proved useful for relieving spasms, indigestion and colic. In addition to this, it is also applied externally on the stomach to stimulate the intestines.

Heel khurd/lesser cardamom or true cardamom (Elettaria cardamomum L.)

Description

Lesser Cardamom belonging to family Zingiberaceae is the dried fruits (capsules) of a stout large perennial herb, greenish to pale-buff or yellowish in color. India, Sri Lanka, Guatemala and Thailand are the major producers of cardamom in the world. It is also found in countries such as Laos, Vietnam, Costa Rica, El Salvador, and Tanzania.

Medicinally Active Constituent

It contains sabinene, cincole, terpinyl acetate, limonene, linalool. Others include moisture 7-10%, volatile oil: 5.5–10.5%, crude fiber: 6.7–12.8%, crude protein: 7.0–14.0, starch: 39.0-49.9, calcium: 0.3%, phosphorus 0.21%, sodium:

Table 1: Pharmacological studies validating medicinal importance of spices and condiments

S. No.	Spice name	Prescribed dose in Unani medicine	Pharmacological actions	Recent experimental evidence for use
1.	Ajowan	3–6 g	Antioxidant, Pro-cholinergic and hypolipidemic activities	Improved viability of spermatogonial cells of mice through induction of Bcl2 and inhibition of BAX[26] Significant increase in step down latency of Passive avoidance paradigm and significant increase in discrimination index of Object recognition task and significant fall in brain AChE activity, brain MDA level and brain nitrite level with simultaneous rise in brain GSH level[27]
2.	Asafoetida	1 g	Antihypertensive, Anti-parasitic activities	*In vivo* study revealed inhibitory effect on cardiovascular responses in acute hypertension induced by Angiotensin II[28] *In vitro* anti-parasitic effects at concentration of 10, 50 and 100 mg/ml killed over 90% of the larvae of Strongylus spp.[29]
3.	Lesser Cardamom	0.5–1 g	Antibacterial and Anti-inflammatory	Antibacterial effect against *Aggregatibacter actinomycetemcomitans*, *Fusobacterium nucleatum*, *Porphyromonas gingivalis*, and *Prevotella intermedia* significantly decreased the secretion of IL-1β, TNF-α, and IL-8 by lipopolysaccharide-stimulated macrophages. The anti-inflammatory activity may result from inhibition of the NF-κB signaling pathway[30]
4.	Celery seed	1–3 g	Antigout Antiinflammatory, Antioxidative and Aphrodisiac effects	*In vivo* study revealed alleviated swelling of the ankle joints and reduced inflammatory cell infiltration around the ankle joints and reduced levels of interleukin (IL) 1β and tumour necrosis factor α and increased the levels of IL10[31] In a parallel, randomized, double-blinded clinical trial, improvement in the total female sexual function index score was significantly greater in celery seed-treated women than those receiving the placebo[32]
5.	Cinnamon	1–2 g	Hypolipidemic, antiinflammatory, antioxidative	*In-vivo* study showed decreased body weight, visceral fat, liver weight and serum glucose and insulin concentrations, liver antioxidant enzymes, and lipid profile (P<0.05) and reduced serum and liver MDA concentration[33]
6.	Clove	0.5–1 g	Anti-inflammatory, antinociceptive, and antipyretic, anticancer activities	In the antinociceptive test, significant decrease in acetic-acid-induced writhing movements and in the hot plate test increase in the reaction latency to pain was noticed. Inhibition of mouse paw edema and significant attenuated hyperthermia was also observed[34] Clove bud-based nanoscale emulsion verified apoptosis and reduction in cancer cell proliferation[35]
7.	Coriander	5–7 g	Neuroprotective and Antioxidant activities	Attenuates LPS-induced inflammatory responses in BV-2 microglial cells and ameliorated the MPTP-induced behavioral impairments and oxidative stress parameters in mouse model of Parkinson's disease, indicating its potential in neuroinflammatory and cognitive behavioral deficits[36]
8.	Calamus	1–3 g	Anticarcinogenic and antiangiogenic, Neuroprotective and Antioxidant	On human gastric adenocarcinoma cell (AGS) line, anti-proliferative effects were noticed in gastric cancer cells that inhibited the angiogenesis in HUVEC cells, G1 arrest in AGS cells and downregulation of Oct4 and Nucleostemin (NS) gene[37] *In vivo* study revealed less oxidative stress markers (superoxide dismutase, glutathione peroxidase, and total antioxidant activity) and elevated plus-maze (EPM) test detects lower stress level indicating control in oxidative stress and inflammation processes[38]
9.	Fennel	5–7 g	Antioxidant	Induced by triflumuron (TFM)-in human carcinoma cells (HCT116), protective effects were observed by increase in cell viability, reduction in ROS generation, and modulation in catalase and superoxide dismutase activities[39]

(Contd...)

Table 1: (*Continued*)

S. No.	Spice name	Prescribed dose in Unani medicine	Pharmacological actions	Recent experimental evidence for use
10.	Fenugreek	3.5–7 g	Antidiabetic and antioxidant	A randomized controlled clinical trial suggested its use as adjuvant therapy to anti-diabetic drugs as it showed insignificant drop in fasting blood glucose but significant increase in fasting insulin level, significant decrease in ratio of high- to low-density lipoprotein with no notable adverse impacts on hepatic and renal functions[40] Seed dietary supplementation has a positive effect on the activities of the hepatic antioxidant defense enzymes (significant (P<0.01) difference among all the liver enzymes) in the aged mice[41]
11.	Saffron	25–50 mg	Neuroprotective, antidepressive and anticancer activities	A double-blind, randomized and placebo-controlled trial proved significant effect on the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) score[42] On liver cancer cell line QGY-7703, significant inhibition of cell growth, arrest of cell cycle in the G0/G1 phase, induction of cell apoptosis and increase in the number of senescent cells were found[43]
12.	Turmeric	3–7 g	Antiviral antioxidant, antidiabetic hypolipidemic activities	In a double-blind, randomized clinical trial, significant decrease in Body mass index, TG, total cholesterol as well as improved some fractions of lipid profile was observed[44] In influenza A virus (IAV), significant inhibition of IAV-induced oxidative stress, increased Nrf2, HO-1, NQO1, GSTA3 and IFN-β production, and suppressed IAV-induced activation of TLR2/4/7, Akt, p38/JNK MAPK and NF-κB pathways were found[45]

0.01%, potassium: 1.2%. iron: 0.012%, vitamins (mg/100 g) vit. B_1 (thiamine): 0.18, vit. B_2 (riboflavin), 0.23%, niacin: 2.3, vit C (ascorbic acid): 12.0 and vitamin A: 175 I.U. per 100 g of the seeds.[1]

Therapeutic benefits

Medicinally, it acts as *Muqawwī-i-Mi'da* (Stomachic), *Mutayyib-i-Dahan* (Fragrant), *Kāsir-i-Riyāḥ*(Carminative), *Mufarriḥ* (Exhilarant), *Musakkin* (Analgesic), *Muqawwī-i-Qalb* (Cardiotonic). In Unani medicine, it is reported to be useful in *Bakhr al- Fam* (Halitosis), *Ḍu'f-i-Hadm* (Indigestion), *Ḍu'f-i-Qalb* (Cardiac insufficiency), *Khafaqān* (Palpitation), *Qay'* (Vomiting), *Ghisyān* (Nausea) and *Nafkh-i-Shikam* (Flatulence).[12] Tinctures of cardamom are used as medicine for relieving flatulence or colic. The seeds are chewed for halitosis, indigestion, nausea and vomiting and use of cardamom and cinnamon as gargle cures pharyngitis, sore throat, hoarseness of voice in flu.

Tukhme Karafs/Celery Seed *(Apium graveolens* L.)

Description

Celery seed belonging to family Umbelliferae is an erect herb, yellowish brown in color, consisting of dried ripe fruit. The native habitat of celery extends from Sweden to Egypt, Algeria and Ethiopia, and in Asia, to India, Caucasus and Baluchistan, also found in France and the USA. In India, it is mainly found in the north-west Himalayas, Punjab and Uttar Pradesh.

Medicinally Active Constituent

It contains 2–3% of a pale-yellow volatile oil in which the principal constituents are: d-limonene: 60%; d-selinene: 10%; sedanan acid anhydride: 0.5% and sedanolide: 2.5–3%.; apoil (a poisonous principle); lucoside, apiin; albumen, oleoresin and mucilage. Others include, fatty oil: 17%; moisture: 5.1%; protein: 18.1%; fat (ether extract): 22.8%; crude fibre: 2.9%; carbohydrates: 40.9%; calcium: 1.8% phosphorus: 0.55%; iron: 0.45%; sodium: 0.17%; potassium: 1.4%; vitamins (mg/100g): vit-B_1 (thiamine): 0.41; vit. B_2 (riboflavin): 0.49; niacin: 4.4; vit. C (ascorbic acid): 17.2; vit. A: 650 I.U. and calorific value (food energy): 450 calories/100 g[1].

Therapeutic benefits

Medicinally, it acts as *Mufattiḥ* (Deobstruent), *Muhallil* (Anti-inflammatory), *Qātil-i-Dīdān-i-Am 'ā'* (Anthelmintic), *Mudirr-i-Bawl* (Diuretics), *Mudirr-i-Ḥayḍ* (Emmenagogue), *Mushtahī* (Appetizer), *Muqawwī-i-Qalb* (Cardiotonic), *Qābid* (Astringent). In Unani medicine, it is reported to be useful in *Istisqā'* (Ascites), *Surfa Yubsiyya* (Dry cough), *Iltihāb al-Shu'ab* (Bronchitis), *Dīq al-Nafas* (Bronchial asthma), *Jarab* (Scabies) and for liver and spleen disorders.[13] They are stimulant and abortifacient too and essential oil in specific, contract gravid and virginal uterus. Fatty oil from the fruits is used as an antispasmodic and nerve stimulant and has been successfully employed in rheumatoid arthritis and probably acts as an intestinal antiseptic.

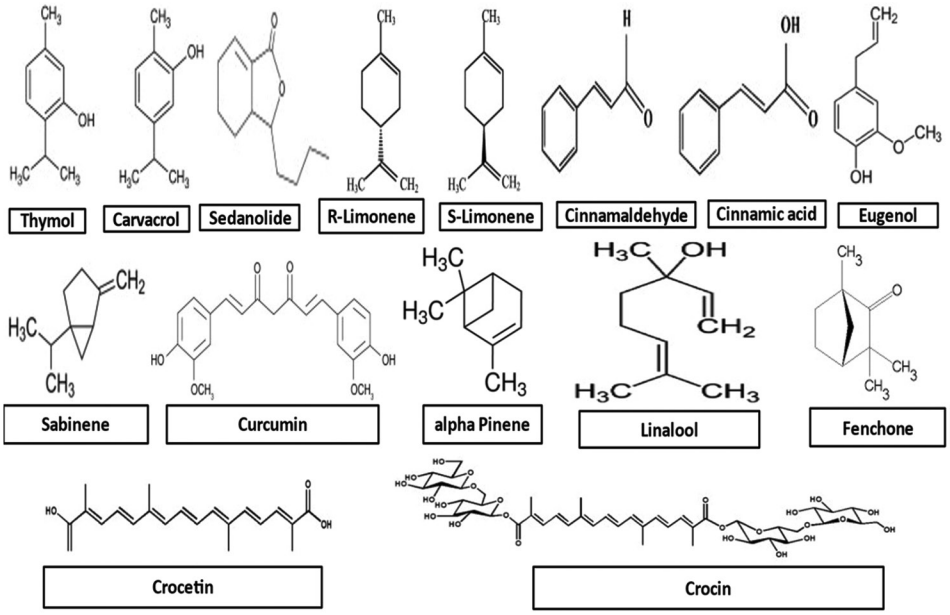

Figure 1: Important bioactive molecules obtained from spices

Darchini/Cinnamon(Cinnamomum zeylanicum Blume)

Description

Cinnamon belonging to the Lauraceae family is layers of dried pieces of the inner bark of branches and young shoots of the evergreen tree, dull yellowish-brown in color, obtained when the cork and the cortical parenchyma are removed from the whole bark. It is found in Sri Lanka, Seychelles Island. In India, it is grown especially in Kerala.

Medicinally Active Constituent

The main constituent includes volatile oil: 0.3–2.8%; fixed oil: 0.3–1.9%, tannin, mucilage, camphor, pinene, cineole, dipentene, phellandrene, eugenol, safrole, caryophyllene, borneol, cinnamic and benzoic aldehydes, and fiber: 25.6–30.5%. Other include moisture: 9.9%; protein: 4.6%; fat (ether extract): 2.2%; fiber: phosphorus: 0.05%o; iron: 0.004%; sodium: 0.01%; potassium: 0.4% 2% carbohydrates: 59.5%; total ash: 3.5%; calcium: 1.6%: 0.4%; vitamins (mg/100g): vit.: B, 0.14; vit. B: 0.21; niacin: 1.9; C:39.8; vit. A: 175 I.U. per 100 g; calorific value (food energy): 355 per 100 g[1].

Therapeutic benefits

Medicinally, it acts as *Mulaṭṭif (*Demulcent), *Kāsir-i-Riyāḥ* (Carminative), *Munaffith-i-Balgham* (Expectorant), *Muqawwī-i-Mi'da* (Stomachic), *Muqawwī-i-Kabid* (liver tonic), *Qābid* (Astringent), *Moḥarrik-i-Bāh* (Sexual desire stimulant), *Mudirr-i-Bawl* (Diuretics), *Mudirr-i-Ḥayḍ* (Emmenagogue) etc. In Unani medicine, it is reported to be useful in *Bakhr al- Fam* (Halitosis), *Bahaq* (Pityriasis), *Ḍu'f-i-Bāh* (Sexual debility), *Dīq al-Nafas* (Asthma) and *Ihtibās al-Bawl* (Urine Retention).[12] Bark oil is extensively used for flavouring confectionery, liquors, pharmaceuticals, soaps and dental preparations.

Quranful/Clove (Syzygium aromaticum L.)

Description

Clove belonging to the family Myrtaceae is the dried flower bud of a medium-sized, evergreen, straight- trunked tree, dark brown or dusky red in color. It is found in Tanzania, India and the USA.

Medicinally Active Constituent

The clove buds, stem and leaves yield essential oils 15–17%, 4.5–5.5% and 1–2% respectively containing free eugenol (70–90%), eugenol acetate, caryophyllene, methyl-n-amyl ketone and naphthalene. Otherinclude moisture: 5.4%; protein: 6.3%; volatile oil: 13.2%; fat: 15.5%; crude fiber: 11.1%; carbohydrates: 57.7%; mineral matter 5.0%; calcium: 0.7%; phosphorus 0.11%; iron: 0.01%; sodium: 0.25%; potassium: 1.2%; vitamins (mg/100g): vit $B_{1:}$ 0.11; vit. $B_{2:}$ 0.04; niacin: 1.5; vit. C:80.9 and vit. A: 175 I. U[1].

Therapeutic benefits

Medicinally, it acts as *Muhallil* (Anti-inflammatory), *Dāfi '-i-Ta'affun* (Antiseptic), *Mufarriḥ* (Exhilarant), *Musakkin* (Analgesic), *Muqawwī-i-Qalb* (Cardio tonic), *Muqawwī-i-Dimagh* (Brain tonic), *Munaffith-i-Balgham* (Expectorant), *Dāfi '-i-Tashannuj* (Antispasmodic), *Muqawwī-i-Mi'da* (Stomachic), *Muqawwī-i-Kabid* (Liver tonic), *Muqawwī-i-Amā* (General tonic) etc. In Unani medicine, it is reported to be useful in *Bakhr al- Fam* (Halitosis), *Waja 'al-Asnan* (Odontalgia), *Ḍu'f-i-Mi'da* (Gastric debility), *Ḍu'f-i-Jigar* (Hepatic insufficiency), *Sū'-i-Haḍm* (Indigestion),

Nafkh-i-Shikam (Flatulence) and *Qūlanj* (Colitis).[12] Clove oil aids in digestion and have antiseptic and antibiotic properties that help in toothache. It is an ingredient of many toothpastes and mouthwashes. It is also beneficial in chest pain, fever, cold and cough. Externally, it has a counter-irritant action.

Kishneez/Coriander (Coriandrum sativum L.)

Description

Coriander belonging to family Umbelliferae is a slender, glabrous, annual herb, brownish-yellow or brown in color, which is pulled out with roots, after drying, fruits thrashed out and dried in sun. It is found in the Mediterranean region, India, United States of America, Morocco, the Commonwealth of Independent States, Hungary, Poland, Rumania, Czechoslovakia, Guatemala, Mexico, etc.

Medicinally Active Constituent

The main constituent includes essential oil (coriandrol/linalool) 0.1–1.7%; fatty oil: 19–21%; linoleic acid: 7%; palmitic: 8%; petroselinic: 53%; tannins, cellulose, pentosans and pigments. Other include moisture: 6.3%; protein: 1.3; fat: 19.6%; crude fiber: 31.5%; carbohydrates: 24.0%; mineral matter: 5.3%; calcium: 0.08%; iron: reduce 0.006%; phosphorus: 0.44%; sodium: 0.02%; potassium: 1.2%; vitamins (mg/100 g): vit. $B_{1:}$ 0.26; vit. $B_{2:}$ 0.23; niacin:3.2; vit. C: 12.0; vit. A: 175 I.U./100 g[1].

Therapeutic benefits

Medicinally, it acts as *Musakkin* (Analgesic), *Muhallil* (Anti-inflammatory), *Muqawwī-i-Qalb* (Cardio tonic), *Muqawwī-i-Dimagh* (Brain tonic), *Muqawwī-i-Mi'da* (Stomachic), *Kāsir-i-Riyāḥ* (Carminative), *Qābid* (Astringent) etc. In Unani medicine, it is reported to be useful in *Sudā '*(Headache), *Duwār* (Vertigo), *Ḍu'f-i-Qalb* (Cardiac insufficiency), *Ḍu'f-i-Mi'da* (Gastric debility), *Nafkh-i-Shikam* (Flatulence) and *Ḍu'f-i-Dimagh* (Weakness of brain).[12] The seeds are chewed to correct halitosis and employed to lessen the intoxicating effects of spirituous liquors.

Waj Turki/Sweet Flag or Calamus (Acorus calamus L.)

Description

Sweet Flag or Calamus belonging to family Araceae is a semi aquatic perennial herb consisting of dried rhizome and is light brown or pinkish-brown in color. It is found in India, Sri Lanka, Europe and the USA. In India, it is plentiful in the marshy tracts of Kashmir and Sir moor, in Manipur and the Naga hills and Karnataka.

Medicinally Active Constituent

The dry rhizomes yield 1.5–2.7%, fresh aerial parts yield 0.123% and unpeeled roots yield 1.5–3.5% of yellow aromatic volatile oil. Others include acorin (glucoside), acoretin (resin), a bitter principle (choline), calamine (crystalline alkaloid), starch, mucilage and tannin in some quantity.[14]

Therapeutic benefits

Medicinally it acts as *Muqawwi-i-A'ṣāb* (Nervine tonic), *Mujaffif* (Desiccant), *Kāsir-i-Riyāḥ* (Carminative), *Munaqqi-i- Dimagh* (Brain cleansing agent), *Mudirr-i- Bawl* (Diuretics) *Mudirr-i- Hayd* (Emmenagogue) *Mulattif* (Demulcent), *Jāli* (Detergent), *Muqawwi-i-Bāh* (Aphrodisiac) etc. In Unani medicine, it is reported to be useful in *Nisyān* (Dementia), *Khadar* (Numbness), *Istirkhā'* (Atony or flaccidity), *Sar '(*Epilepsy), *Fālij* (Hemiplegia),*Amrāḍ-i-Wabāi* (Epidemic diseases), *Ihtibās-i-Hayd* (Amenorrhea) and *Sū'-i-Haḍm* (Indigestion).[13] As a stomachic, it is also administered to animals. The powdered rhizome also possesses insecticidal properties and is useful against bed-bugs, moths, lice, etc.

Badiyan/fennel (*Foeniculum vulgare* Mill.)

Description

Fennelbelonging to family Umbelliferae is a biennial or perennial erect glabrous aromatic herb, greenish or yellowish-brown in color. It is cultivated in Mediterranean countries, Romania and India. In India, it is mainly cultivated in Maharashtra, Gujarat, Karnataka, some parts of Western Uttar Pradesh, Punjab and Haryana.

Medicinally Active Constituent

It contains volatile oil (0.7–6.0%) as chief component. The oil comprises of 70% anethole (d-phellandrene and d-limonene) and 6% fenchone. Fixed oil, 9.0–13% is also present and the component of the oil are palmitic: 4%; oleic: 22%; linoleic: 14%; and petroselinic: 60% acids. Others include, moisture: 6.30%; protein: 9.5%; fat: 10%; crude fiber: 18.5%; carbohydrates: 42.3%; mineral matter: 13.4%; calcium: 1.3%; phosphorus: 0.48%; iron: 0.01%; sodium: 0.09%; potassium: 1.7%; vitamins (mg/100 g)-vit. B, 9.41; vit. B, 0.36; niacin: 6.0; vit.C: 12.0; vit. A: 1,040 I.U./100 g; calorific value (food energy): 370 calories per 100 g[1].

Therapeutic benefits

Medicinally, it acts as *Mufattiḥ* (Deobstruent), *Kāsir-i-Riyāḥ* (Carminative), *Muqawwī-i-Mi'da* (Stomachic), *Mudirr-i- Bawl* (Diuretic), *Mudirr-i- Hayd* (Emmenagogue), *Muqawwī-i-Baṣar* (Eye tonic) etc. In Unani medicine, it is reported to be useful in *Waja 'al- Mi'da* (Gastralgia), *Nafkh-i-Shikam* (Flatulence), *Ḍu'f-i-Mi'da* (Gastric debility), *Ihtibās-i-Bawl* (Retention of urine), *Ihtibās-i-Hayd* (Amenorrhea) and *Ḍu'f-i-Basarat* (Asthenopia).[12] It checks griping in purgatives and is considered a good vermicide against hookworm. It is also employed as a masticatory or for chewing alone or in betel and as a corrective for less pleasant drugs such as senna and rhubarb.

Hulba/Fenugreek (Trigonella foenum-graecum L.)

Description

Fenugreek belonging to family Papilionaceae is the dried seed of an erect annual herb, deep olive yellow in color. It is found in South-eastern Europe and West Asia, India, Argentina, Egypt and Mediterranean countries like southern France, Morocco and Lebanon.

Medicinally Active Constituent

It contains fixed oil, alkaloids, flavonoids, glycosides, tannins, triterpenes, steroids (diosgenin), starch, sugars, mucilage, saponins, fatty acids consist largely of linoleic, oleic and linolenic acids etc. Others include moisture: 6.3%; protein: 9.5%; fat: 10.0%; crude fiber: 18.5%; carbohydrates: 42.3%; ash: 13.4%; calcium: 1.3%; phosphorus: 0.48%; iron: 0.011%; sodium:0.09%; potassium: 1.7%; vit. A: 1,040 I.U./100g; vit. $B_{1:}$ 0.41 mg/100: vit. $B_{2:}$ 0.36; vit. C: 12.0and niacin: 6.0 mg/100g; calorific value (food energy): 370 calories/100 g[1].

Therapeutic Benefits

Medicinally, it acts as *Mudirr-i- Bawl* (Diuretic), *Mudirr-i- Hayd* (Emmenagogue), *Mulattif* (Demulcent), *Kāsir-i-Riyāḥ* (Carminative), *Munaffith-i-Balgham* (Expectorant) and *Muhallil* (Anti-inflammatory). In Unani medicine, it is reported to be useful in *Sar* '(Epilepsy), *Istirkhā'* (Atony or flaccidity), *Niqris* (Gout), *Istisqā'-Ziqqī* (Dropsy), *Sual-i-Muzmin* (Chronic Cough), '*Izam al-Tihāl* (Splenomegaly), *Waram al-Rahim* (Metritis), *Bawāsīr* (Haemorrhoids), *Zahīr* (dysentery), *Ishāl* (diarrhoea), *Fasād al-Hadm* (dyspepsia)and *Ḍu'f-i-Ishtiha* (Anorexia).[15] It is helpful in treating diabetes and lowering cholesterol. It also stimulates the digestive process and metabolism in general as well as helps to promote lactation too.

Zafran/Saffron (Crocus sativus L.)

Description

Saffron belonging to family Iridaceae is a bulbous, perennial dried yellowish style and dark red or reddish-brown stigma. Basically, it is native to southern Europe and cultivated in Mediterranean countries such as Spain, Austria, France, Greece, England, Turkey, Persia, India, and Iran. In India, it is cultivated by corms in the Kashmir valley, especially in the Pampor plateau.

Medicinally Active Constituent

It contains essential oil and the principal coloring agent found in saffron is the glycoside crocin, other include crocetin, safranal, and kaempferol; the bitter substance found is the glucoside picrocrocin.[1]

Therapeutic benefits

Medicinally, it acts as *Jāli* (Detergent), *Dāfi '-i-Ta'affun* (Antiseptic), *Muhallil* (Anti-inflammatory), *Muqawwī-i-Qalb* (Cardiac Tonic) etc. In Unani medicine, it is reported to be useful in *Amrāḍ -i-Qalb* (Cardiac Diseases), *Nazla-o-Zukām* (Coryza and Catarrh) and *Ḍu'f-i-Basarat* (Asthenopia). It is also reported that it is used in fevers, melancholia, hepatomegaly and splenomegaly. It acts as stimulant and stomachic and is considered to be a remedy for catarrhal affection of children.[11]

Zard Chob/Turmeric (Curcuma longa L.)

Description

Turmeric belonging to family Zingiberaceae is a perennial herb with rhizomatous and tuberous roots, pale green or yellow in color. It is a native of India, China, is now a commercial crop of the tropics. It is also cultivated extensively in Sri Lanka, Pakistan, Haiti, Jamaica, Peru, Bangladesh, El-Salvador, Thailand, Taiwan etc. In India, it is cultivated mainly in Andhra Pradesh, Maharashtra, Orissa, Tamil Nadu, Karnataka and Kerala.

Medicinally Active Constituent

The dried rhizomes yield 5–6%, while fresh ones have 0.24% essential oil and about 58% of the oil is composed of turmerones (sesquiterpene ketones), curcumin, pinene, ocimene, linalyl acetate and 9% tertiary alcohols. Other includes, oleoresin, phytosterols, moisture 5.8%; protein: 8.6%; fat: 8.9%; carbohydrates: 63.0%; fiber: 6.9%; mineral matter: 6.8%; calcium: 0.2%; phosphorus 0.26%; iron 0.05%; sodium: 0.01%; potassium: 2.5%; vit. A: 175 I.U./100g; vit $B_{1:}$ 0.09 mg/100 g; vit. B_{2}:, 0.19; vit.C: 49.8 and niacin: 4.8 mg/100 g; calorific value: 390 calories per 100 g[1].

Therapeutic benefits

Medicinally, it acts as *Musakkin* (Analgesic), *Dāfi '-i-Ta'affun* (Antiseptic), *Musaffī-i-Dam* (Blood purifier), *Muhallil* (Anti-inflammatory), *Dāfi '-i-Tashanuj* (Antispasmodic), *Mujaffif* (Desiccant) etc. In Unani medicine, it is reported to be useful in *Qurūh* (Ulcers), *Zarb-o-Saqta* (Trauma, Faintness), *Amrāḍ-i-Jild* (Skin disorders), *Nazla* (Coryza), *Dīq al-Nafas* (Bronchial asthma) and *Ḍu'f-i-Basarat* (Asthenopia).[16] The juice of the raw rhizomes is used as anti-parasitic for many skin disorders. Burnt turmeric when applied as tooth powder relieves dental troubles. The juice of turmeric rhizomes relieves purulent ophthalmia. It also makes coping with diabetes easier. Traditionally, it was used as a beauty aid, hair remover and for improving skin quality and there are cosmetic preparations such as vanishing creams and other facial products with turmeric as an important ingredient.

METHODOLOGY

The Study Area

The review was accomplished at Hakim Ajmal Khan Institute for Literary and Historical Research in Unani Medicine, an

institute of excellence for survey of Unani literature and a centre for literary research.

Methodology of the Study

The ethnobotanical literature was collected in the period of May to July 2021 and the focus of the review is to provide useful insight on spices and condiments with reference to Unani medicine. Various scientific publications indexed in PubMed, Google scholar, Science Direct, Web of Science, Scopus including systematic reviews, meta-analysis, randomized controlled trials, preclinical studies and observational studies were taken. First, titles and abstracts of pertinent studies were assorted and then the full texts of these studies were taken into account. Special attention was given to find relevant and comprehensive literature from ancient classical texts of Unani medicine regarding identification of promising spices and condiments and their health benefits. The appropriate Unani terminology used in the manuscript was consulted from "Standard Unani Medical Terminology," a standard book developed by Central Council for Research in Unani Medicine and World Health Organization.[17] The keywords used for the search included "spices", "herbs," "antioxidant," "chemical composition," "clinical trials," "*in vivo* study" etc.

RESULTS AND DISCUSSION

On account of its ability to undertake health promotion and disease prevention, Unani medicine is of great relevance to present-day healthcare. Spices and condiments have been an integral part of the Unani therapeutics since ancient times. The fundamental framework of the Unani system is holistic in nature and offers treatment of disease taking into account the whole constitution of the body rather than taking a reductionist approach towards a disease. The system advocates regulation of quality and quantity of food for treating certain ailments, thus, Dieto- therapy (*Ilāj bil Ghidhā'*) is a unique mode of treatment in this medical system.[18] The foods when used as medicine act upon the human body in three ways: by their quality alone, or simply by their element, or by their substance as a whole.[19] Theinstruction on diet to the patient when given largely rests upon practical acquaintance with the culinary art and the form in which a food article is given is of real importance for the management of any ailment. Additionally, spices and condiments are used based on an individual's temperament and the type of illness, for example if abnormal humor with oily ailment persists, it is corrected by spices such as caper, onion, and garlic.[20] Avicenna in his exclusive treatise on cardiac drugs (*Risala fi al-Adwiyat al-Qalbia*) included 34 aromatics, out of 63 total cardiac drugs described such as saffron, cinnamon, sweet basil, coriander, thyme, mint, cassia bark, tamarind etc. Spice's rich in aroma and their benefits are mentioned with stress being laid upon the use of aromatics in cardiac treatment with the justification that sensory power of pneuma is naturally inclined toaroma.[21] The long historical use of herbs and spices for their medicinal benefits is fully acknowledged, and there is a growing amount of literature concerning the potential/ purported benefits of these foods from a health perspective that include their possible role in conferring protection against development of acute and chronic, noncommunicable diseases, cardiovascular and neurodegenerative diseases, cancer, and type 2 diabetes mellitus.[2] Spices used in folk and traditional medicine have been accepted currently as one of the main sources of cancer chemopreventive drugs like clove, a commonly used spice when studied against cancer cell lines of various anatomical origin proved to be an effective cytotoxic agent and is endowed with apoptotic inducing capability.[22] Components of turmeric, including turmerin, turmerone, elemene, furanodiene, curdione, bisacurone, cyclocurcumin, calebin A, and germacrone have numerous biological actions including antioxidant, anti-inflammatory, anticancer, antigrowth, anti-arthritic, anti-atherosclerotic, antidepressant, anti-aging, antidiabetic, antimicrobial, wound healing, and memory-enhancing activities. The importance of elemene derived from turmeric is so much that it is approved in China for the treatment of cancer.[23] In recent times, pharmacological evidence supporting the medicinal effect of spices and condiments is summarised in Table 1.

In the crisis of COVID 19, the antiviral potential of common spices and herbs mainly curcumin, cinnamon, ginger, clove, black pepper, garlic, neem, basil was studied by a questionnaire-based online survey in which it was found that 93.6% of people used spices for curing coronavirus or other viral infection as well as boosting immunity. As evident from different studies, spices such as clove, cinnamon, ginger, black pepper, and turmeric are known to be immunity boosters along with antiviral actions, similarly cinnamon, black pepper, tulsi, and turmeric play a key role against SARS-CoV-2, tulsi used for curing pain, pneumonia, diarrhea, cough, and fever that are the common symptoms of COVID-19 and black pepper having quercetin, a flavonoid improves the body's immunity constantly due to its antiviral properties provides relaxation from sinusitis and nasal congestion, which are the most common symptoms of COVID-19.[24] The holistic nature of spices performs a wide variety of bio-functions and synergistic actions that contribute a substantial amount of minerals and micronutrients, including iron, magnesium, and calcium to protect human health. Important bioactive molecules and their structures derived from spices are depicted in Figure 1. As the cases of deficiencies of iron, zinc, iodine and vitamin A is prevalent, identified enhancers of micronutrient bio accessibility that include sulfur compound-rich Allium spices—onion and garlic and pungent spices—pepper (both red and black) as well as ginger having antioxidant properties is being utilized. These food components evidenced to improve the bioavailability of micronutrients are common ingredients of culinary and information on the beneficial effect of these spices on micronutrient bio accessibility is considered novel.[25]

CONCLUSION

This review highlights promising health benefits of commonly used spices and condiments in Unani medicine such as cinnamon, turmeric, fenugreek, and clove which are easily accessible and safe to use. It provides ample evidence that spices are the sources of many important constituents that possess antioxidative, anti-inflammatory, analgesic, anticarcinogenic, and cholesterol-lowering activities. Bioactive compounds obtained from spices can serve as promising therapeutic agents against several diseases. Comprehensive exploratory methods are required to improve the existing method and develop new procedures for optimized extraction and refining separation methods of active components from herbs and spices. Awareness of the valuable effects of these common spices and condiments would help in devising correct dietary approaches as well as usage as remedies. The highly significant dimension of Unani medicine treating various ailments with spices and condiments needs proper attention for its scientific approval. Therefore, systematic scrutiny of the therapeutic efficacy as well as safety of spices will be useful in making wise decisions about their application. The substantial evidence will validate the claims of Unani medicine practitioners and prove instrumental for scientists also for advance studies on this aspect with more mechanistic targets. Furthermore, it is also found that very few clinical trials have been conducted on spices and condiments, so authors suggest investigating and determining the active biomolecules present in spices, their mechanism of action in more clinical studies for their effectiveness against diverse diseases.

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