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Coriandrum sativum Linn. Traditional, Biochemical and Biological activities: An Overview

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ABSTRACT

The oldest form of medicine known to mankind is herbal medicine. Today, it is the most widely practiced form of medicine in the world. Using medicinal plants for treatment is considered very safe as there is no or minimal side effects. Most of the plant materials collected from the rain forests and other places are currently used for conducting extensive research for their potential medicinal value. In Ayush systems of medicine about 8,000 herbal drugs have been codified [2]. One of them is *Coriandrum sativum* Linn. belongs to the family Apiaceae and commonly known as kishneez khushk in Unani medicine.[3]It possesses multiple pharmacological activities which are revealed previously, such as anxiolytic, antidepressant, sedative-hypnotic, neuroprotective, antibacterial, antifungal, anthelmintic, insecticidal, antioxidant, cardiovascular, analgesic, anticonvulsant, memory enhancing, antidiabetic, anticancer, gastrointestinal, deodorizing, dermatological, hypolipidemic, anti-inflammatory, diuretic, reproductive, hepatoprotective,, antimutagenic, detoxification etc[4,14]. The current review gives an overview of the pharmacological effects and chemical constituents of *Coriandrum sativum*.

Keywords: *Coraindrum sativum* Linn. herbal medicine, pharmacological activities.

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INTRODUCTION

From several thousands of years plants have been used for medicinal purposes. In developing countries a majority of the world's population, relies on herbal medicine to meet its health needs[1]. In the present era of synthetic drug, the herbal drug treatment is still a desirable treatment and the reason is its reduced risk of side effects, effective in chronic conditions, low cost and widespread availability[2]. In Unani system of medicine, kishneez khushk (*Coriandrum sativum*) has been used in various ailments. Its pharmacological actions has been documented as *Muqawwi dimagh* (Brain tonic), *Muqawwi qalb* (Cardio tonic), *Muqawwi jigar* (Liver tonic),*Muqawwi aam* (General tonic), *Muqawwi bah* (Aphrodisiac),*Kasir Riyah* (Carminative), *Muharrik* (Stimulant) etc and it is used to treat many disorders such as *Zaufe qalb* (Heart weakness), *Zaufe meda* (Stomach weakness), *Sue hazm* (Dyspepsia),*Khafqaan* (Palpitation), *Zaheer* (Dysentry),*Ishal* (Diarrhoea) etc.[5,6]

Figure 1

TAXONOMICAL CLASSIFICATION[4]

Kingdom	:	Plantae
Subkingdom	:	Tracheobionta
Superdivision	:	Spermatophyte
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Subclass	:	Rosidae
Order	:	Apiales
Family	:	Apiaceae
Genus	:	Coraindrum
Species	:	sativum

VERNICULAR NAMES

Arabic : kazbara, kuzbura[4, 7, 9]

Persian : kishneez[3]

Chinese : yuan sui, hu sui[4]

English : coriander [7, 9, 16], cilantro, collender, Chinese parsley[4, 7]

Oriya : dhania[3]

French : coriander, coriandre cultivé [4, 7]

German : koriander, Wanzendill, Schwindelkorn[4]

Greek : koriannon, korion[4,7]

Telegu : dhaniyalu[3, 7, 9, 16]

Hindi : dhania, dhanya[3, 4, 7, 9, 16]

Italian : coriandolo, coriandro[4]

Japanese : koendoro[4]

Portuguese: coentro, coriandro[4]

Sanskrit : dhanayaka, kusthumbari [3, 4, 7, 16]

Spanish : coriandro, cilantro, cilandrio, cilantro[4]

Swedish : coriander [4]

Bengali : dhana[7], dhania, bhoti[3, 9]

Gujarati : dhana[7], kenphir, dhanis[3]

Kashmiri : dhaniwal, dhannawal[3]

Malayalam: malli, kothimbir, kothamalli[3, 9, 16], kottampalari [3, 7, 16]

Marathi : dhana,kothimbir, dhanya,khotbir,kothmir[3]

Punjabi : dhania[3]

Urdu : dhania[3]

Tamil : kottamalli[3, 7, 16], dhaniya[3]

Sind : dhano[7]

Kannada : havija, kothambaribija, kothambri [3]

DISTRIBUTION[4, 7, 8, 9, 16]

Coriandrum sativum Linn. is native to Eastern Mediterranean region and it is used as a spice plant in India, China, Russia, Central Europe, and Morocco. However, now it was distributed in Europe (Denmark, Czechoslovakia, Germany, Hungary, Netherlands, Finland, Ireland, Norway, Sweden, UK, Austria, Belgium, Poland, Switzerland, Belarus, Estonia, Latvia, Lithuania, Moldova, Ukraine, Albania, Bulgaria, Greece, Italy, Romania, Yugoslavia), France, (Portugal and Spain), Northern Africa (Algeria, Morocco, Tunisia and Ethiopia), Asia (Afghanistan, Iran, Iraq, Azerbaijan, Georgia, Southern Russia, Kazakhistan, Kyrgyzstan, Tajikistan, Turkmenistan, Palestine, Jordan, Lebanon, Syria, Turkey, Armenia, Uzbekistan, China, India and Pakistan).

DISCRIPTION OF PLANT IN UNANI (MAHIYAT) [5, 6, 9]

Kishneez khushk is a branched, glabrous, slender, annual[3, 8, 16] herbaceous plant. It is a tropical crop and for its seed production, it is generally sown in winter season[3], when it crushed or damaged it gives characteristic aroma.[3, 5] .The whole plant, mainly the unripe fruits is characterized by a strong aromatic odour. [3, 9]

MORPHOLOGY OF PLANT

It is an erect herb attaining a height of 30cm with a strong aromatic odour. Leaves are pinnatifid or decompound arranged alternatively. A fruit having mericarps with 5-ridged, having secondary ridges between them and oil canals. Its fruits consists of two halves, they are yellow to brownish in colour having a diameter of 2mm-3.5mm.[3, 5, 9]

MACROSCOPIC[3, 9]

The drug consists of entire cremocarps, 2-4mm [3]in diameter. Each cremocarp consists of two mericarps, unified by their margins. The variation in the size of fruit of coriander is observed. The oval variety of fruits are more generally distributed. On the apex two divergent styles are present. Ten primary ridges are present which are wavy and camouflaged on the surface. The fruit has a spicy taste with an aromatic odour.

MICROSCOPIC [3, 9]

A transverse section of a fully ripe fruit shows only two vittae in each mericarp, on the commissural surface. The numerous vittae present in the immature fruit on the dorsal surface of each mericarp gradually join and are eventually compressed in two slits. The outer part of the pericarp which possesses stomata and prisms of calcium oxalate is completely thrown off. A thick layer of sclerenchyma with pitted fusiform cells is formed within the region of the mesocarp. In the outer layer these sclerenchymatous fibres bend on secondary ridges, all are tangentially directed, but most of the fibres are longitudinally directed. Trasversing the band of sclerenchyma, corresponding in position to the primary ridges, are small group of spiral vessels. Irregular polygonal cells with lignified walls are present within sclerenchymatous band of mesocarp.The inner epidermis of the pericarp is composed of parquetry cells. The testa is composed of dark brown flattened cells. The curved endosperm consists of parenchymatous cells containing fixed oil and aleurone grains.

CHEMICAL COMPOSITION[4, 9]

The phytochemical screening of plant showed the presence of essential oil, reducing sugars, alkaloids, flavonoids, tannins, terpenoids, fatty acids, sterols, phenolics and glycosides. The most important constituents of fruits coriander were the fatty oil and essential oil. The content of essential oil of dried coriander fruits varies between 0.03 and 2.6%, while the fatty oil content varies between 9.9 and 27.7%.The leaves and seeds showed variations in oil due to

variations in the cultivar and not as a result of geographic divergence and ecological conditions. However, the compounds quarantined from essential oil were included: Monoterpene hydrocarbons, Monoterpene Esters, Monoterpene oxides, Monoterpene alcohols Sesquiterpenes, Phenols, Aliphatic alcohols,Aliphatic aldehydes, Aliphatic hydrocarbons. The exploration of the essential oil conducted by gas chromatography-mass spectroscopy, shown 33 components, representing 99.99% of the total oil from the seeds of coriander. The major components were linalool (55.09%), α-pinene (7.49%), 2,6-Octadien-1-ol, 3,7-dimethyl-, acetate, (E)- (5.70%), α,α,4-trimethyl- (4.72%), citronellyl acetate (1.77%), and undecanal (1.29%) hexadecanoic acid (2.65%), tetradecanoic acid (2.49%), geraniol (4.83%), 3-Cyclohexene-1methanol 2-α-pinene (2.39%). The Korean *Coriandrum sativum* leaves and stems were extracted and the composition of essential oil was studied. Thirty-nine components signifying 99.62% of the total oil were identified from the leaves. The major components were cyclododecanol (23.11%), tetradecanal (17.86%), 13-tetradecenal (6.85%), 1-dodecanol (6.54%), dodecanal (5.16%), and 1-undecanol (2.28%), and decanal (2.33%) 2-dodecenal (9.93%), 1-decanol (7.24%). On the other hand, thirty-eight components signifying 98.46% of the total oil were identified from coriander stem. The major components were phytol(61.86%), dodecanal(3.18%), 15-ethyltricyclo [6.5.2(13,14),0(7,15)]-pentadeca1,3,5,7,9,11,13-heptene (7.01%) and1-dodecanol (2.47%).Caffeic acid, glycitin, and protocatechinic acid were the major polyphenolics of coriander aerial parts.

MIZAJ (Temperament): Cold 2^0 and Dry 2^0.[5,6,9]

Cold 2^0 and Dry 3^0 [5]

HISSA MUSTAMELA (Parts used): Fruit [4, 7, 9, 16]

Fresh leaves [4, 7, 16]

MIQDARE KHURAK (Therapeutic Dose): 5-7g[3, 5, 6, 9]

FORM USED: Powdered form [3, 9, 7]

MAZARRAT (Adverse Effects): It reduces the semen and stiffness of penile muscles.[5]

MUSLEH (Correctives): Half fried egg and Asal [5]

Sikanjabeene Safar Jali [6]

BADAL (Substitute): Tukhm Kahu (*Lactuca sativa* Linn.), Khashkhaash (*Papaver somniferum* Linn). [5, 6, 9]

COMPOUNDS: Khamira Gaozaban Sada, Khamira Gao Zaban Ambari Jawahar Wali, Jawarishe Shahi, Itrifal kishneezi, Dawaul Misk Motadil Sada, Qurse Ziabetus Sada, Arqe Musaffie Khoon Qawi, Itrifal Zamani, Itrifal Muqawwie Dimagh, Jawarish Ood Mulaiyyin, Roghane Kishneez, Arqe Amber, Qurse Tabasheer Qabiz. [5, 6, 9]

PHARMACOLOGICAL ACTIONS:

- *Mufarreh* (Exhilarant) [5,9]
- *Muqawwi meda* (Stomachic) [3,5,7]
- *Munauwim* (Hypnotic) [5,7,8]
- *Musakkin* (Sedative) [3,5]
- *Mushtahi* (Appetizer) [5,7,8]
- *Muqawwi dimagh* (Brain tonic) [3,8]
- *Muqawwi qalb* (Cardio tonic) [3,5,8]
- *Muqawwi jigar* (Liver tonic) [8]
- *Mubarrid* (Coolent) [8,9]
- *Qatil deedan ama* (Antihelmenthic) [7,8]
- *Daf atash* (Quenching thirst) [8]
- *Kasir riyah* (Carminative) [3,7,8,9]
- *Muharrik* (Stimulant) [7,8]
- *Mane iltehab* (Anti-inflammatory) [5,8]
- *Mane qai* (Antiemetic) [5,8]
- *Daf tashannuj* (Antispasmodic) [5,7]
- *Mulaiyin* (Laxative) [8]
- *Hazim* (Digestive) [5]
- *Mudirre baul* (Diuretic) [5,8,9]
- *Dafe humma* (Antipyretic) [5,8]
- *Dafe safra* (Antibilious) [5,7,8]
- *Iltehab shobatur riyah* (Bronchitis) [8]
- *Muqawwi aam* (General tonic) [7]
- *Muqawwi bah* (Aphrodisiac) [7,8]
- *Warm khusiya* (Orchitis) [5]

THERAPEUTIC USES:

- *Zofe qalb* (Heart weakness) [3,9]
- *Zofe meda* (Stomach weakness) [3,9]
- *Sue hazm* (Dyspepsia) [5,7,8]
- *Ashob chashm muzmin* (Chronic conjunctivitis) [7]
- *Qai* (Vomiting) [5,7,8]
- *Suda* (Headache) [3,8]
- *Quroo*he majrae-baul (Urethral ulcers) [5,9]
- *Shara* (Urticaria) [5]
- *Fawaq* (Hiccup) [8]
- *Waj-ul- asab* (Neuralgia) [7]
- *Sual* (Cough) [7,8]
- *Ishal* (Diarrhoea) [5,9]
- *Yarqaan* (Jaundice) [8]
- *Bawasir damwi* (Bleeding piles) [7,8]
- *Jarb* (Scabies) [7,8]
- *Zaheer* (Dysentry) [8]
- *Khafqaan* (Palpitation) [5,9]
- *Qula* (Stomatitis) [5,8]
- *Nafkhe shikam* (Flatulence) [5,7,9]
- *Deedan shikam* (Helminthiasis) [5]
- *Jiryan lissa damiya* (Bleeding gums) [8]
- *Wajaul asnan* (Toothache) [5,7,8]
- *Nazfuddam* (Epistaxis) [5,9]
- *Sara* (Epilepsy)[5]
- *Qurooh* (Ulcers) [7,8,9]
- *Atashak* (Syphilis) [8]

PHARMACOLOGICAL STUDIES

- Antidepressant effect [4,10]
- Anticonvulsant effect [4,14]
- Sedative- hypnotic effect [4]
- Anxiolytic effect [4,10,11]
- Antibacterial effect [4]
- Antifungal effect [4,14]
- Anthelmintic effect [4]
- Antioxidant effect [4,10,14]
- Hypolipidemic effect [4,14]
- Anti-inflammatory effect [4]
- Analgesic effect [4]
- Antidiabetic effect [4]
- Antimutagenic effect [4]
- Anticancer effect [4]
- Cardiovascular effect [4,13]
- Gastrointestinal effect [4]
- Hepatoprotective effect [4]
- Deodorizing effect [4]
- Detoxification effect [4]
- Diuretic effect [4]
- Dermatological effect [4]
- Effect on fertility [4]
- Glucose/ serum deprivation- induced cytotoxicity [12]
- Memory enhancing activity [4]
- Neuroprotective effect [15]

CONCLUSION

Kishneez khushk is one of the most important herbal drug obtained from the *Coriandrum sativum* Linn.of family Apiaceae which is used by the physicians of Unani system of medicine, for the treatment of various diseases.The modern studies also confirm its wide range of activities. This review discusses and compiles the information about its chemical constituents, pharmacological and therapeutic effects. According to the wide range of pharmacological activities, it should be measured as an auspicious basis of many drugs.

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