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# REVIEW ON PHARMACOLOGICAL ACTIVITY OF CORIANDER PLANT

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**ABSTRACT**
*Dhaniya is a popular name for Coriandrum sativum. It is an annual herb that has long been used as a spice. This plant's fresh leaves are known as cilantro. This plant's edible, fragrant seeds, leaves, and fruits are used to flavor curries, soups, and other Indian foods. This plant's fruit is used to make cakes, buns, and pastries as well as curry powder and other flavors. Coriander seed is particularly well-known for its therapeutic value; in particular, the seeds of this plant are utilized to make Ayurvedic medicines and are traditionally used by numerous tribes to treat a variety of illnesses. Coriander plant is considered as a medicinal herb in traditional medicine system as it has various properties like they act as anti-diuretic, anti-diabetic, anti-hypertensive, aphrodisiac, anti-microbial, anti-oxidant, analgesic, anti-inflammatory and anti-asthmatic agent.*

**KEYWORDS**: *Dhania, Rasapanchaka, Linalool, Immunomodulatory, Antibacterial, Anthelmintic.*

## INTRODUCTION

Both traditional and contemporary medical systems rely heavily on plants. Since ancient times, phytomedicines—drugs derived from plants—have been used to improve health. Currently, there is a renewed interest in using phytomedicines, particularly for preventative purposes. Eighty percent of people rely on traditional medicines, mostly made from herbs, according to a WHO research. One of the earliest plants, coriander (Coriandrum sativum L.) has been used for food and medicine for more than 3,000 years (Ebers papyrus, 1550 BC). Given the historical context of the Queen of Sheba's visit to King Solomon, which is mentioned in the Bible, coriander is one of the most important and ancient seed spices in the world. With an annual production of almost three lakh tons, India is the world's largest producer, buyer, and exporter of coriander. Because of their color and scent, the plant's seeds and green leaves are eaten and used as garnish in a variety of cuisines. Coriander oil is used in the cosmetics sector for body care products and fragrances, and other elements of the coriander plant have been linked to a variety of health benefits. This review covers a wide range of coriander topics that may be useful for interdisciplinary subjects, such as its botanical information, folk uses, Ayurvedic applications, phytochemical constituents, and medicinal potential.

### Botanical description of Coriandrum sativum

The "dhaniya" plant, Coriandrum sativum, is a member of the Apiaceae (Umbelliferae) family.Its seeds are the primary means of cultivate. It is an annual plant with a tap root system. The plant's upright stem can grow up to 20–120 cm in height. It takes 45 to 60 days after seeding to begin flowering. This plant has lanceolate-shaped, green leaves. The blooms are carried in small, asymmetrical, white or light pink umbels with petals pointing away from the center. The coriander seed has two mericarps and is an oblong, globular, dry schizocarp.



**Figure 1: Coriander (Coriandrum sativum).**

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**Geographical Distribution Coriandrum sativum**

Coriander is native to the Middle East and the Mediterranean, and it grows wild in Sudan and Egypt. It has been produced for ages and was among the first flavors used by humans. Morocco, Romania, Bulgaria, France, Spain, Italy, the Netherlands, Myanmar, Pakistan, Turkey, Mexico, Canada, Argentina, Australia, and some parts of the United Kingdom and the United States are among the nations where it is mostly grown.

India is the world's largest producer of coriander. Tamil Nadu, Rajasthan, and Andhra Pradesh are the main states where it is grown.

**Phytochemical's constituents of Coriandrum sativum**

The medicinal importance of the Coriander plant is due to the availability of bioactive chemical constituents which are present both in seeds and leaves.

**Seed :-** Volatile oil, Tocol, Sterol, Lipids, polyphenols.

**Volatile Oil**

The chemical makeup of coriander seed essential oil from different regions of the world was investigated. This study led to the conclusion that alcoholic monoterpenes were the primary component of coriander, with (S)- (+)- linalool being the primary active constituent. While only 17 components were identified in the essential oil made from coriander seeds grown in Algeria, 35 different components were found in coriander essential oil from Tunisia, Bangladesh, and India. The essential oil extracted from coriander seeds is a rich source of oxygenated monoterpenes, with linalool being the primary active component found in Tunisian coriander seeds with a percentage of 87.54, according to research on the chemical composition of coriander seeds conducted in various regions.

Additionally, linalool (73.1%) was shown to be the primary active ingredient in the essential oil of Algerian coriander seeds, although the other main components were: Alpha-pinene (3.41%), neryl acetic acid derivative (3.22%), and pmentha-1,4-dien-7-ol (6.51%) were also detected in the Algerian oil. Additionally, linalool (73.1%), neryl acetic acid derivation (2.3–14.2%), gamma-terpinene (0.1–13.6%), and alpha-pinene (1.2–7.1%) were identified as the primary constituents in the Iranian coriander seed vital oil, whereas linalool (37.65%), geranyl acetic acid derivation (17.57%), and γ-terpinene (14.42%) were identified as the main constituents in Banglades.

The volatile oils from coriander seed were found to be α-Thujene, α-Pinene, Camphene, Sabinene, β-Pinene, Myrcene, Decanal, D-Limonene, 1, 8 Cineol, ρ-Cymene, Lemonene, γ-Terpinene, 2-Decenal, Decanol, Linalool, Camphor, Bornel, α-Terpinol, Geraniol, (E)-2-Dodecenal, and Geranyl acetate.

**Tocol**

Tocols (327.47 µg/g) are among the other chemical components found in coriander seeds. γ-tocopherol (26.40 µg/g) is the most significant component of tocopherol, followed by δ-tocopherol (13.50 µg/g) and α-tocopherol (11.70 µg/g). Additionally, coriander seed has higher levels of tocotrienol, with γ-tocotrienol being the primary component (238.40 µg/by), followed by α-tocotrienol (24.90 µg/g) and δ-tocotrienol (12.57 µg/g).

**Sterols**

It has been shown that coriander seeds are a significant source of sterols, which have an inhibitory effect on dietary cholesterol consumption. According to the measurement, the total sterol concentration is found to be between 36.93 to 51.86 mg/g of oil. The most common sterol indicators found in coriander seeds are stigmasterol (21.7-29.8%) and β-sitosterol (24.8-36.8%). Δ 7-stigmasterol, Δ 5, 24-stigmastadienol, and campesterol are the additional sterol components found, but Δ 7-avenasterol and Δ 5-avenasterol are discovered in smaller amounts. There is extremely little cholesterol (1.02-2.18%) in Tunisian coriander seeds. The two other sterol components, ergosterol and lanosterol, are present in German Coriandrum sativum L. seeds, but this component is absent.

**Lipids**

Fatty acids: Petroselinic (C18:1n-12) acids (65.70-80.9%) and linoleic (C18:2n-6) acids (13.05-16.70%) were the most prevalent fatty acids in lipids. Other representative unsaturated fatty acids identified were stearic (C18:0) (0.78 2.91%), palmitic (C16:0) (0.10-3.96%), and oleic (C18:1n-9) (0.20 7.85%). Furthermore, minor fatty acids such as arachidic (C20:0) (0.1 - 0.2%), α-linolenic (C18:3n-3) (0.1-0.5%), and palmitoleic (C16:1n-7) (0.4-1.1%) were discovered. Triacylglycerols (95.5%), free fatty acids (2.0%), diacylglycerols (1.8%), & 0.5% diacylglycerols, which make up 94.8% of the total lipids, are the predominant inactive lipid components in coriander seed oil.

Furthermore, coriander seeds were also discovered to contain polar lipids, but at comparatively lower amounts of 8.1 and 6.6%. Phosphatidylcholine, the major phospholipid subclass, made up the majority of these (35.9%), phosphatidylethanolamine (33.8%) & phosphatidylinositol (15.4%) providing support. In addition, digalactosyldiacylglycerol (62.3%) & monogalactosyldiacylglycerol (37.6%) were the most abundant galactolipids.

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**Polyphenols**

Coriander seed's phenolic content is still inconsistent. However, it was reported that a total of 21 components were found in various coriander seed varieties, including 11 phenolic acids (such as gallic, chlorogenic, caffeic, vanillic, p-coumaric, ferulic, rosmarinic, o-coumaric, trans-hydroxycinnamic, salicylic, and trans-cinnamic acids) and ten flavonoid components (such as quercetin-3 rhamnoside, rutin trihydrate, luteolin, kaempferol, apigenin, apigenin, and coumarin).According to these studies, Tunisian coriander has a higher concentration of phenolic acids (81.47%) than Syrian coriander, which has a higher concentration of the flavonoid class (61.34%) due to the presence of luteolin (18.13%) and rutin trihydrate (13.06%), while Egyptian coriander has a similar concentration of both phenolic and flavonoid compounds. its methanolic extract's linalool content41. Another study looking into the phytochemicals of Coriandrum sativum found rosmarinic acid, caffeic acid, and chlorogenic acid.

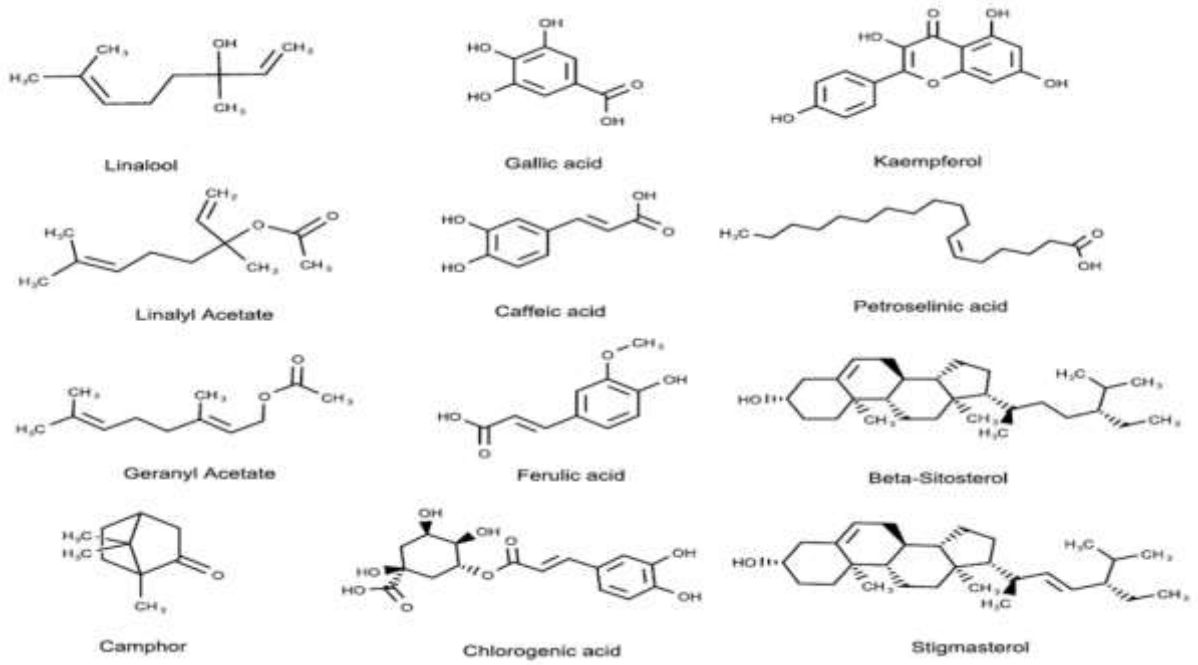



**Figure 2: Chemical structures of Coriandrum sativum phytochemical components**

**Leaf**

The coriander plant's leaves also contain essential oil, flavonoids, phenolic acids, lipids, and polyphenols, but they have received less research attention than its seeds.

The most prevalent fatty acids in coriander leaves are polyunsaturated fatty acids. With percentages of 39.4 and 41.1% in the upper and basal leaves, respectively, A-linolenic (C18:3n 3) was the most prevalent fatty acid, which is supported by linoleic, heptadecenoic, and palmitic acids. The additional acids that were discovered were oleic, stearic, stearidonic, cis, and transpalmitoleic acids. These acids were identified in very small amounts and collectively account for roughly 9.6% and 4.7% of the total fatty acids detected in both basal and higher leaves.

According to the research, coriander leaves, which account for 61.4% of the carotenoids found in the etheric extract, are also a good source of β carotene, a precursor to vitamin A. Violaxanthin, neoxanthin, lutein-5,6-epoxide, and β-cryptoxanthin epoxide were the additional chemicals that were isolated. Total carotenoids and β-carotene were found to be higher prior to the flowering stage (i.e., 217.50 mg/100 g and 73.64 mg/100 g, respectively).

**Polyphenols**

Vanillic, p-coumaric, cis-ferulic, and trans-ferulic acids are the primary phenolic acids found in Indian coriander leaves. Furthermore, coriander leaves were shown to contain the flavonoids kaempferol, quercetin, 3'-OMe quercetin, 4'-OMe quercetin, and acacetin; however, glycoflavones were not found in coriander leaves. Therefore, it has been discovered that Indian coriander leaves are a good source of quercetin. According to earlier reports, phenolic acids, which include caffeic acid (4.34 µg/ml), protocatechuic acid (6.43 µg/ml), and glycitin (3.27 µg/ml), are the primary bioactive components in an aqueous extract of Brazilian coriander leaves. Anthocyanin, which aids in the biosynthesis process, is also present in coriander leaves.

**Coriander**

Compared to its seeds, the coriander leaf has fewer essential oils. Alcohols and aldehydes are the primary constituents of essential oil derived from its leaves, according to several studies. Additionally, it was demonstrated that the 44 chemicals that make up the essential oil extracted from the Bangladeshi coriander plant are primarily aromatic acids, such as 2 decanoic acid (30.8%), E-11-

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tetradecenoic acid (13.4%), and capric acid (12.7%). In addition, the Kenyan coriander plant's essential oil is primarily composed of alcohols (46.3%) and aldehydes (56.1%). (E)-2-decenal (15.9%), decanal (14.3%), (E)-2-decen-1-ol (14.2%), and n-decanol (13.6%) are its active constituents. (E)-2-tridecen-1-al, (E)-2-dodecenal, dodecanal, undecanol, and undecanal were the other chemical components discovered. Decanal (19.09%), trans-2-decenal (17.54%), 2-decen-1-ol (12.33%), cyclodecane (12.15%), cis-2-dodecane (10.72%), decanal (4.1%), and dodecan-1-ol (3.13%) are the essential oils of the Brazilian type of coriander species49. (E)-2-decenal (18.02%), decanal (14.36%), dec-9-en-1-ol (11.66%), (E)-2-dodecenal (8.72%), ntetradecanol (6.09%), dodecanal (5.81%), and decanol (5.77%) were the main volatile components in the leaf essential oil of the Indian coriander plant.

**Folk uses of Coriandrum sativum**

The plant Coriandrum sativum is widely used. In many cultures, coriander is used as a folk cure for a variety of illnesses and to add flavor to meals. Coriander was utilized as a spice in Greek and Roman cultures. It was used to preserve bread and meat and to add flavor. The Romans brought coriander to Britain. Chinese, American, and Indian cuisines also make use of it. In some traditional methods, concoctions prepared from coriander leaves are applied topically to treat cough, gall bladder issues, chest pain, and to improve sexual behavior. Folk remedies for bronchitis, vomiting, dysentery, gout, rheumatism, intermittent fever and giddiness, indigestion, inflammation, and diarrhea include coriander fruits. It is also used as an ointment for arthritis. In Saudi Arabia, many people utilize infusions of coriander seeds to treat diabetes. The seed extract is utilized as a contraceptive and antifertility agent. Coriander fruits and leaves are used in traditional Fijian customs. While the seed infusion is used as an eyewash for eye conditions, the leaf juice is used for skin-related issues. Seeds are also used to treat headaches. They utilize seed decoction to treat mouth diseases and bad breath. Fruits, on the other hand, have aphrodisiac, stomachic, stimulant, carminative, and diuretic properties. In Iran, the juice of young coriander leaves and fruits is used to treat convulsions, increase appetite, and alleviate anxiety and insomnia.

**Properties of Dhanyaka**

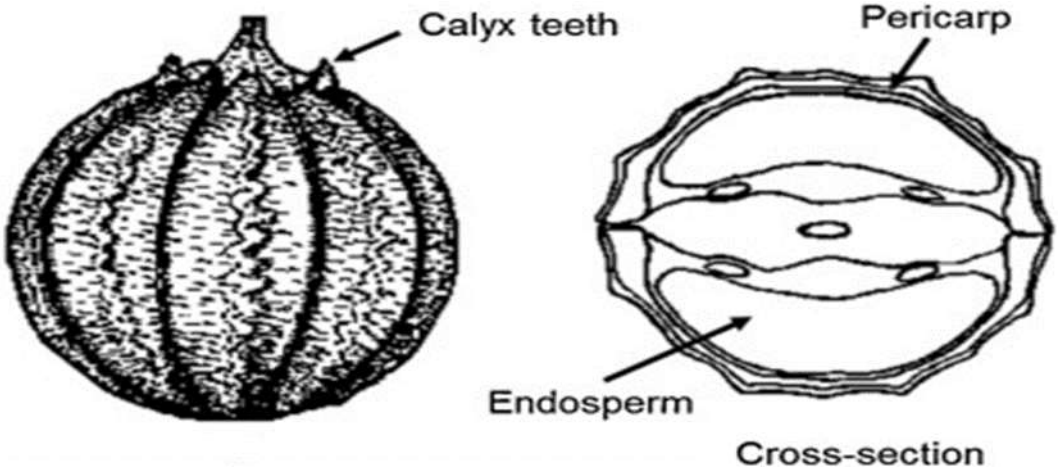
It decreases the sexual desires. / It has anti-aphrodisiac property. does not have aphrodisiac property. Mutrala – Diuretic, increase urine volume Deepana – Improve digestion strength Jwaraghna – Useful in fever Rochana – Improves taste, useful in anorexia Grahi – Absorbent, Useful in malabsorption syndrome and diarrhea Daurgandhya Hashana – Helps to get relief from bad odor (Bad Breath) Hridya – Good for heart, cardiac tonic Trushna – Excessive thirst Daha – Burning sensation Vami – Antiemetic Shwasa – Asthma, Chronic Obstructive Pulmonary Disease (COPD), wheezing, breathing difficulty Kasa – Cough, cold Arsha – Haemorrhoids Krimi – Worm infestation

**Therapeutic properties of Coriandrum sativum**

**It gives many therapeutic in the body likes -**

1. Antioxidant activity
2. Diuretic effect
3. Insecticidal effect
4. Menstrual Disorder
5. Aflatoxin control
6. Anti-diabetic effect
7. Antibacterial Activity
8. Anti-inflammatory effect
9. Diuretic
10. Anti-fungal

**Microscopic view of Coriander fruits**



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**Modern View**

Adulteration is currently the main problem facing the natural medication sector. People are losing faith in herbal medicines as a result of this key flaw in its promotion. Today, intentional adulteration is fairly widespread and can be done in a variety of ways, such as by adding hazardous ingredients, using already made substances, or substituting an inferior variety. Vendors of therapeutic plants have discovered various methods of adulterating herbal medications, which are difficult to identify without microscopic inspection and chemical analysis.

## CONCLUSION

Due to its culinary and medicinal qualities, Coriandrum sativum is an ancient spice utilized in many different cultures throughout the world. Nearly every conventional medical system makes use of it. It is primarily used in Ayurveda to improve digestion and appetite as well as to balance all three doshas. In contrast, it is mostly utilized in baking and cooking in the folk system. In a distinct culture, it is used in various ways. Antimicrobial, antioxidant, anti-mutagenic, anxiolytic, sedatives, anti-depressant, neuroprotective, anti-diabetic, diuretic, and anti-hypertensive phytochemicals are found in every portion of coriander.

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