



# A BRIEF REVIEW OF CORIANDRUM SATIVUM LINN

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**Abstract:** The Dhaniya, also known as the *Coriandrum Sativum* family Umbelliferae, is a well-known ayurvedic medicinal tree. It is a tiny tree that grows all throughout Italy, India, Bangladesh, China, Netherlands, and Central and Eastern Europe. Monoterpenes,  $\alpha$ -pinene, limonene,  $\gamma$ -terpinene, p-cymene, borneol, citronellol, camphor, geraniol, coriandrin, dihydrocoriandrin, coriandrins A–E, flavonoids, and essential oils are present in the plant's various parts. This plant has diuretic and antioxidant properties in its seed, leaves, flower, and fruit. Anthelmintic, anti-diabetic, anti-convulsant, sedative hypnotic, anti-microbial, and anti-mutagenic properties.

**Keywords:** *Coriandrum sativum*, pharmacological activity, chemical composition

## I. INTRODUCTION

Dhaniya consist of dried and ripe fruit obtaining from *Coriandrum Sativum Linn* belonging to family *Umbeliferae* (*Apiaceae*) a slender, glabrous, branched, with characteristic aroma. [1] It is an important annual spice herb which is mainly cultivated for its fruit as well as for its green leaves.

The crop, indigenous to southern Europe and the Mediterranean region, is the most important seed spice grown in india. [2] India is the producer, consumer and exporter of coriander in the world with an annual production of around three lakh tonnes. [3] *Coriandrum sativum* is consists of number of phytochemicals such as essential oil, tannins, terpenoids, reducing sugars, alkaloids, phenolics, flavonoids, fatty acids, sterols and glycosides.

It is also contained elements consists of high nutritional properties like proteins, oils, carbohydrates, fibers and wide range of minerals, trace elements and vitamins. [4]

Coriander is commonly used in gastrointestinal disfunctions such as anorexia, dyspepsia, flatulence, diarrhoea, griping pain and vomiting. Coriander fruit is also reputed as refrigerant, tonic, diuretic, and aphrodisiac, while, its essential oil is considered useful in flatulent colic, rheumatism, neuralgia, etc. coriander is also used as antidiabetic, antihypertensive, lipolytic and myorelaxant, and possess nerve soothing property. Coriander is used to flavour several alcoholic beverages. [5]

## II. TAXONOMICAL CLASSIFICATION

Kingdom: Plantae

Subkingdom: Tracheobionta

Super division: Spermatophyta

Division: Magnoliophyta

Class: Magnoliopsida

Order: Apiales

Family: Apiaceae (Umbeliferae)

Genus: *Coriandrum L.*

Species: *Coriandrum sativum L.*

Botanical Name: *Coriandrum sativum L.* [6]

### III. MORPHOLOGY

Macroscopic characteristics:

- 1) Colour: Yellowish brown to brown
- 2) Odour: Aromatic
- 3) Taste: Spicy and characteristic
- 4) Shape: Sub-globular cremocarpous fruit
- 5) Size: Fruits are 2-5 mm in diameter and 4-30 mm in length
- 6) Extra features: About 10 primary ridges and 4 secondary ridges. Primary ridges are wavy and inconspicuous, while secondary ridges are straight. [7]

### IV. CHEMICAL COMPOSITION

Different kinds of proteins, lipids, carbs, fibers, minerals, and vitamins may be found in coriander. 87.9% moisture, 33% protein, 0.6% fat, 65% carbs, and 17% mineral matter are found in fresh coriander leaves. The moisture content of dried, mature coriander seeds ranges from 6.3 to 8.0 percent. Other ingredients include fatty oils (13–18%), crude proteins (11.5–21.3%), fat (17.8–19.15%), crude fibers (28–29 1%) and ash (4.9–6.0%). [38]

Glycolipids (GL), such as glucocerebroside, steryl glucoside, and acylated steryl glucoside (ASG), are present in coriander seeds. Compared to immature fruits, ripe fruits have less than 1% of essential oil concentration. By using pentane for steam distillation and capillary gas chromatography-mass spectrometry for analysis. There were 41 compounds found in all, including alkenals in C9–C16 and alkanals. [39]

Chemical group	Composition
Alcohols	Linalool (60-80%), geraniol (1.2-4.6%), terpenin-4-ol (3%), $\alpha$ -terpineol (0.5%)
Hydrocarbons	$\gamma$ -terpinene (1-8%), r-cymene (3.5%), limonene (0.5-4%), a-pinene (0.2-8.5%), camphene (1.4%), myrcene (0.2-2%)
Ketones	Camphor (0.9-4.9%)
Esters	Geranyl acetate (0.1-4.7%), linalyl acetate (0-2.7%) [8][10]

### V. PHARMACOLOGICAL ACTIVITY

- **Antibacterial activity**

Nine distinct pathogenic bacteria were isolated from urine, blood, stool, and cerebrospinal fluid of various patients. The antibacterial properties of aqueous and ethanolic extracts of different coriander parts were examined against these bacteria (*Burkholderia capacia*, *Escherichia coli*, *Enterobacter cloacae*, *Gamella morbillorum*, a-Haemolytic streptococci, *Klebsiella pneumonia*, *Proteus mirabilis*, *Streptococcus pneumonia*, and *Salmonella typhi*). Coriander seed extract in cold water showed inhibitory effects on a few examined microorganisms. Conversely, ethanolic extracts of seeds, leaves, and stems demonstrated a broad spectrum of antibacterial activity, with the greatest inhibition zone values seen against *Proteus mirabilis* and *Klebsiella pneumoniae* [83]. The antibacterial and antifungal properties of coriander essential oils were tested on commercial samples. As test organisms, 25 different bacterial genera and one kind of fungal species (*Aspergillus niger*) were employed. Essential oil has high degree of protection against all the microorganisms [9][23][24]

- **Diuretic**

The use of coriander as a diuretic plant in Moroccan pharmacopoeia is validated by the aqueous extract of coriander seed, which has both saluretic and diuretic activity. Aqueous extract of coriander seed was given to anesthetized Wistar rats by continuous intravenous infusion for 120 minutes at two doses (40 and 100 mg/kg). The common diuretic furosemide (10 mg/kg) was utilized as the reference medication. Urine was tested for the excretion of water and electrolytes (sodium, potassium, and chloride), and the glomerular filtration rate—which is equivalent to creatinine clearance was calculated.

Furosemide was more effective as a diuretic and saluretic than the crude aqueous extract of coriander seeds, which enhanced diuresis, electrolyte excretion, and glomerular filtration rate in a dose-dependent manner. The plant extract's mode of action seems to be comparable of furosemide. [11][25]

- **Antioxidant Activity**

Using the aldehyde/carboxylic acid test, the antioxidant activity of the examined essential oils and their mixes was evaluated. The foundation of this technique is the suppression of aldehyde's autoxidation to carboxylic (hexanoic) acid when antioxidant-active substances are present. When used in conjunction with capillary GLC, this technique allows researchers to examine antioxidant characteristics and quantify variations in the concentration of each constituent of essential oils as they autoxidize. The DPPH radical-scavenging test, inhibition of 15-LO, and inhibition of phospholipid peroxidation are further methods used in this procedure. Extracts from seeds and leaves both demonstrated DPPH scavenging activity that was concentration-dependent. [19][26]

- **Antidiabetic activity**

Rats given a high-fat diet with additional cholesterol were used to study the effects of coriander seed administration on lipid metabolism. *Coriandrum sativum* seeds were included in the diet. The seeds exhibited a notable hypolipidemic effect. The level of total cholesterol and triglycerides increased considerably in the experimental group of rats (tissue). The experimental group exhibited a noteworthy elevation in B-hydroxy and B-methyl glutaryl CoA reductase, as well as plasma lecithin cholesterol acyl transferase activity (LCAT). When comparing the experimental group to the control group, the levels of low density lipoprotein (LDL) and very low density lipoprotein (VLDL) cholesterol dropped and the levels of high density lipoprotein (HDL) cholesterol increased. Its hypocholesterolemic impact appeared to be caused by increased plasma LCAT activity, accelerated cholesterol breakdown to fecal bile acids, and neutral sterols. [12][27][40]

- **Anti-convulsant activity**

To assess the folkloric use of this plant, researchers looked at the anti-convulsant properties of coriander sativum seed extracts in both aqueous and ethanolic forms. The antiseizure action was evaluated using two anti-convulsant evaluation tests: the maximum electroshock test and pentylenetetrazole (PTZ). Aqueous and ethenolix extracts delayed the beginning of clonic convulsions in the pentylenetetrazole test, and their anticonvulsant effect at a high dose (5 mg/kg) was comparable to that of phenobarbital at a dose of 20 mg/kg in the PTZ test. In the maximal electroshock test, both extracts demonstrated statistically significant anticonvulsant action and reduced the duration of tonic seizures at high doses. [16][28]

- **Sedative Hypnotic Activity**

Iranian traditional medicine has advised *Coriandrum sativum* L. as a sleep aid. To assess hypnotic and sedative activities Rats are given an aged and hydroalcoholic extract as well as essential oil. The experiment's findings indicate that at 200, 400, and 600 mg/kg of pentobarbital, the duration of sleep was prolonged by aqueous extract. In comparison to the group treated with saline, the pentobarbital-induced sleeping period was extended by hydro-alcoholic extract at doses of 400 and 600 mg/kg. Only at 600 mg/kg did the essential oil lengthen the duration of pentobarbital-induced slumber. Coriander seed extracts and essential oil have sedative-hypnotic properties. [17][29][41]

- **Anti-microbial Activity**

Two isolates of *Candida albicans* were recovered from urine specimens, and 186 bacterial isolates from 10 distinct genera of the Gve bacterial community were subjected to aqueous infusions and aqueous decoctions of coriander (*Coriandrum sativum*). The technique of good diffusion was utilized. Coriander's aqueous infusion and decoction exhibited no antibacterial action against *Candida albicans* or G-ve urinary pathogens. [13][30]

- **Anti mutagenic activity**

Both plant and animal systems can metabolically convert aromatic amines into carcinogenic substances. The most well-studied plant-activated promutagen is 2-aminofluorene (2-AF); m-phenylenediamine (m-PDA) is converted to mutagenic products detected by the *Salmonella typhimurium* TA98 strain; and 4-nitro-o-phenylenediamine (NOP) is a well-known direct-acting mutagen whose mutagenic potential can be enhanced by plant metabolism. Both 2-AF and m-PDA are highly potent mutagens that cause DNA frame shift when activated by plant cells. mutations, *Coriandrum sativum* is a common plant that is typically eaten raw in Mexican cuisine. [18][31]

- **Antifungal Activity**

First, combine a 6-to 7-gram nutritional broth with 500 milliliters of water. After that, place it in the autoclave, pour it, and wait until the next day. Apply a fungal strain to it the following day; if any results appear, the outcome will be positive; if none, the outcome will be negative.

Since the results of the antifungal test were unchanged in the presence or absence of an osmotic protector (sorbitol), our findings demonstrated that the antifungal capabilities of *Coriandrum sativum* are unrelated to cell wall biosynthesis pathways. Rather, as the quantity of exogenous ergosterol rose, the EO's MIC values increased by 8 to 16 times, suggesting that the EO may bind to membrane ergosterol and enhance ionic permeability, which in turn may cause cell death. [20][32]

- **Insecticidal activity**

In laboratory experiments, essential oils extracted from coriander were tested for their ability to fumigantly repel rice weevil (*Sitophilus oryzae* L.), adzuki bean weevil (*Callosobruchus chinensis* L.), and rice moth (*Corcyra cephalonica*). The test substance, insect type, and exposure duration all affected the responses. [14][33]

- **Anthelmintic activity**

The nematode parasite *Haemonchus contortus* was used to test the *in vitro* anthelmintic properties of crude aqueous and hydro-alcoholic extracts of the seeds of *Coriandrum Sativum* (Apiaceae). *In vivo* anthelmintic efficacy of *Coriandrum Sativum* aqueous extract was also studied in sheep infected with *Haemonchus contortus*. The two extract varieties of *Coriandrum Sativum* prevented eggs from hatching, fully at a dosage of less than 0.5 milligrams per milliliter. The ED(50) of the hydro-alcoholic extract of *Coriandrum Sativum* was 0.18 mg/ml, whereas the aqueous extract's was 0.12 mg/ml. There was no discernible statistical difference between the hydro-alcoholic and aqueous extracts. Compared to the aqueous extract, the hydro-alcoholic extract exhibited superior *in vitro* efficacy against adult parasites. [11][34]

## VI. MEDICINAL USES

For thousands of years, coriander has been utilized in medicine. The ancient Egyptians recorded using the herb for therapeutic purposes for the first time. Coriander's medicinal properties are also mentioned generally in classical Greek and Latin literature (Manniche 1989). The German emperor Charlemagne's 812 order 'Capitulare de villis' also contains directions on growing coriander (Göök 1977). It's said that the coriander fruits improve digestion.

Moreover, coriander is applied topically to relieve rheumatism and ulcers; Hegi (1926) lists these and numerous additional medical applications for coriander. Cicin (1962) describes the present usage of coriander for medicinal purposes. In India, the produce are regarded as aphrodisiacs, stomachic, aphrodisiac, diuretic, tonic, and carminative

However, their main uses are to mask the taste or smell of other substances in therapeutic formulations (Jansen, 1981 also reports this usage) and to balance off the rhubarb and senna's gripping properties (Bhatnagar, 1950). Chewing the seeds helps treat halitosis. In modern conventional medicine, the medication is also referred to as "*Coriandri fructus*" or "*Fructus coriandri*" is rarely utilized. However, according to Ebert (1982), it is still included in the official listings of pharmaceutical plant medications in Germany and Austria. Pruthi (1980) mentions the antimicrobial properties of coriander essential oil. [21][36][35]

## VII. CONCLUSION

Since ancient times, foods have been seasoned with herbs and spices, which also extend food's shelf life and improve health. One herb that works miracles is coriander. It serves as a spice in addition to a herbal remedy. Plants can be cultivated all year round, but they undergo processing to improve their flavor, profitability, and potential to be traded internationally. Nutrients including lipids, proteins, vitamins, minerals, and other elements can be found in the very fragrant leaves and fruits. Its health benefits activities ranging from antibacterial to anticancer properties. The most significant and well-known characteristic of coriander is that it functions as an antioxidant. This plant is appropriately referred to as the "herb of happiness" because of its many applications as well as its preventative and preventive properties against a number of chronic illnesses.

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