

## Coriander and Its Phytoconstituents for the Beneficial Effects

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### ABSTRACT

The well-known medicinal herb coriander (*Coriandrum sativum* L.), which is classified taxonomically as a member of the Apiaceae family, is used extensively as a spice, in medicine, and in the food and pharmaceutical sectors. This plant, which has been believed to be one of the earliest spices, has been utilized in folk medicine, particularly in Egypt. Coriander (also known as cilantro, kişniş, Chinese parsley, or *Coriandrum sativum*) is widely used in nearly all recipes.

Two distinct species, *Coriander sativum* L. and *Coriander tordylium* (Fenzl) Bornm, were recorded in the Flora of Turkey for the genus Coriander. The primary reason it is grown is for its seeds, or fruits, which are rich in fatty acids, polyphenols, coumarins, flavonoids, and essential oils. These days, the fruits show results in numerous illnesses that are internally carminative, spasmolytic, and galactagogic. The application of coriander in various

**Keywords:** Apiaceae, coriander, *Coriandrum sativum*, Kişniş, oil

becoming more and more involved in food, health, and nutritional goods. The most widely utilized secondary metabolites of plants, essential oils have been used for thousands of years (over 5000 years) for a variety of purposes, mostly due to their positive effects on health. According to history, the medication *Quinta essentia*, so named by Swiss physician Paracelsus von Hohenheim, is where the word "essential oil" originated in the sixteenth century. This term "essential oil" or "essence" refers to its flammable principle. Throughout a wide range of literary works, essential oils have been. In short, essential oils are secondary metabolites that are biosynthesised in various plant organs. They are primarily obtained by hydrodistillation from nearly all aromatic plant parts that grow in temperate regions of the world. These elements are secretory special elements with volatile properties and distinctive fragrances that are soluble in organic solvents and limpid when rarely colored. The majority of the terpenes (monoterpenes and partially sesquiterpenes generated by isoprene) and aromatic compounds derived from phenylpropane and phenolic components make up the complicated chemical composition of essential oils. Concentrated hydrophobic aromatic oils are also referred to as semiliquids, ethereal oils, steam volatile liquids, or fragrant oils. The wonderful scent and flavor of the essential oils come from their corresponding sources, which are essentially plants. Although the physiological effects of essential oils are unclear, it is possible that they either attract pollinating insects or shield plants from bacteria and other pests. The traditional techniques for obtaining essential oils include solvent extraction, Soxhlet extraction, hydrodistillation, steam distillation, cold pressing, enfleurage, cohobation, and maceration.

It is worth noting that the most popular technique for acquiring essential oils is distillation. Furthermore, solvent-free microwave extraction (SFME), ultrasound-assisted extraction (UAE), microwave-assisted hydrodistillation (MAHD), supercritical fluid extraction (SFE), and microwave

### I. INTRODUCTION



(fig:1 Cilantro)

Aromatic and medicinal plants have always been highly valued for their culinary, medicinal, and other uses. Plants and their secondary metabolites, or phytochemicals, are

hydro diffusion and grav-ity (MHG) can also be considered new approaches. To guarantee high-quality essential oils, the European Pharmacopeia (EP), the Council of Europe (COE), the World Health Organization (WHO), and the International Organization of Standardization (ISO) have released analytical monographs. Although the essential oils are explored in a wide range of literary works and demonstrated in numerous significant biological activities, their antibacterial and antifungal properties predominate.

Essential oils hold significant commercial value, particularly in the culinary, pharmaceutical, agronomic, cosmetic, and fragrance industries. Furthermore, because essential oils combine with vegetable oil in a variety of ways, they serve as aromatherapy's primary therapeutic agent. The Food and Drug Administration (FDA) has classified essential oils as "Generally Recognized as Safe" (GRAS). This means that, when used responsibly and sensibly, they are not considered hazardous and, because of their natural origin, are more commonly endorsed by consumers than "synthetic" agents. There are actually a lot of things to discuss about essential oils, but for the purposes

of this piece, we'll focus on coriander as an aromatic plant and its essential oil.

## II. METHODOLOGY

PubMed, Science Direct, Scopus, and Google have all been used in the investigation of the phytochemical ingredients and pharmacological activity related to coriander and its essential oil. When preparing this evaluation, the most recent articles were typically selected.

### Description of coriander

Members of the Apiaceae (formerly Umbelliferae) family,

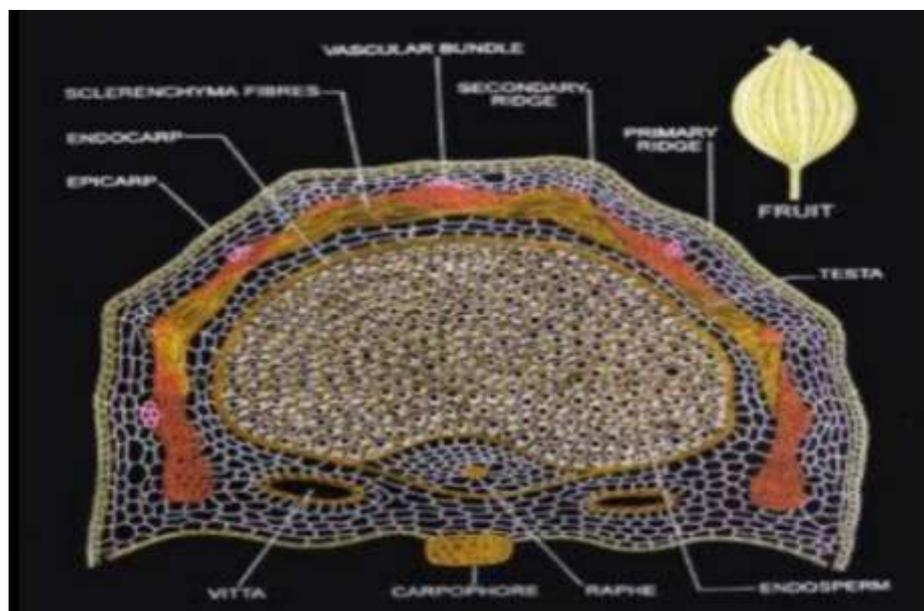
*Coriandrum sativum* L., is also referred to as cilantro, cilantrillo, Arab parsley, Chinese parsley, Mexican parsley, *Dhania*, and Yuen sai. This perennial herb is frequently used in Southeast Asian, Middle Eastern, Mediterranean, Indian, and Latin American cooking. Despite their apparent similarity, the terms cilantro and coriander actually have different meanings. The green leaves of the plant are known as cilantro when they are picked fresh; coriander is the name given to the herb when dried fruits are used.



(fig:2 Coriander)

### Classification

Kingdom	Plantae
Subkingdom	Tracheobionta
Super division	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Apiales
Family	Apiaceae
Genus	<i>Coriandrum</i>
Species	<i>Coriandrum Sativum</i>



(fig:3 Coriander Fruit T.S)

### History of coriander

The use of *Coriandrum sativum* L. in cooking dates back many years. This herb has been mentioned in Sanskrit literature from before 5000 BC and Greek Ebers Papyrus from earlier 1550 BC. The Greek words "korus" and "annon," which give rise to the word "korannon," are the source of the coriander name. By the way, Pliny the Elder was the first to use the genus name "Coriandrum." According to legend, the coriander seed first appeared in Israel's Nahal Hemel Cave during the Neolithic era. However, it's interesting to note that a half-liter of coriander seeds was discovered in Tutankhamun's (Ramesses II) Egyptian tomb. Because of its aphrodisiac qualities, the herb was known as "spice of the happiness" in ancient Egypt. Coriander appears to have been cultivated in Greece at least since the second millennium BC. Hippocrates used the plant in traditional medicine and also used it in cooking and perfumes. The Roman Empire also made extensive use of the herb. For instance, the cookbook Apicius, which consists of a compilation of Roman cooking recipes, has about 70 coriander-based recipes. About 900 AD, coriander was used in Germany. In the Voronez district of Russia, the first factory to use steam distillation to extract the essential oil of coriander was constructed in 1885.

### Phytochemical constituents of coriander

Native to the eastern Mediterranean, *Coriandrum sativum* L. is a medicinal plant that may have spread to India, China, and other parts of the world along with many other aromatic plants. In this context, the primary secondary metabolite of coriander is the essential oil. But the current compilation will also address another class of active ingredients. Sugars, alkaloids, flavones, tannins, resins, anthraquinones, sterols, and fixed oils are all present in the fruits. It is possible to argue that the fatty and essential oils found in coriander fruits are their most significant components. Petroselinic acid (cis6octadecenoic acid, 18:1), linoleic acid (18:2), oleic acid (18:1), and palmitic acid (16:0) are the fatty acids found in coriander fruits. According to reports, coriander, along with all other leafy green vegetables, is a rich source of vitamin (high amount of vitamin A/ $\beta$ carotene: 12 mg/100 g and vitamin C: 160

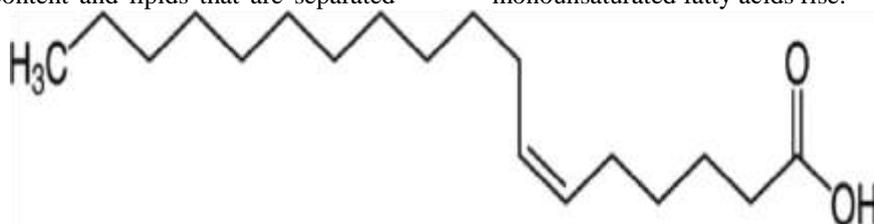
### Essential oils

Gathering coriander essential oil from various locations requires a lot of work. Despite the fact that the parts' compositions can vary, coriander is one of the most significant spices that contains essential oils in its leaves, blossoms, stem, seeds, roots, and bark. It's noteworthy to note that the aroma of the coriander fruit (seed) differs greatly from the aroma of the herb due to changes in its chemical composition that occur during

ontogenesis. The unpleasant stench known as "stink bug smell" emanates from immature fruits and leaves and is caused by the oil's trans-tridecen content. However, the mature fruits have a lovely scent that is reminiscent of sage and citrus peel.

### Fatty acids

Particularly from French origin (23% yield), the vegetal oil (fixed oil/fatty oil) of coriander fruits contains a significant concentration of monounsaturated fatty acids (1.8%); in particular, petroselinic acid (73%) is present. Coriander vegetable oil has been classified as a Novel Food Ingredient (NFI) and is safe for healthy individuals to use up to 600 mg of it daily as a dietary supplement. Because of the presence of petroselinic acid, the essential oil extracted from *C. sativum* fruits is known as triglyceride oil (Figure 3). It is known that the plant has essential oil with a high linalool content and lipids that are separated



### Polyphenols

Because of their potent biological effects, coriander fruits and leaves contain polyphenols, which are highly significant secondary metabolites. Fruit phenolic components have generally been identified as flavones, tannins, and anthraquinones. Using LC/MS, certain phenolic chemicals in coriander leaves might be made to appear somewhat familiar. After comparing the polyphenol profiles of leaves and fruits, it was discovered that the main ingredient in plant parts, leaves, and fruits was quercetin-glucuronide. Additionally, coriander leaves have significant concentrations of gallic, ferulic, caffeic, and chlorogenic acids.

### Carotenoids

Commercial coriander types underwent HPLC/MS analysis to determine their carotenoids content, specifically  $\beta$ -carotene (a precursor to vitamin A). The mature foliage of all kinds produced under similar conditions had a higher level of  $\beta$ -carotene content than the seedlings and seeds. During the pre-flowering stage, for example, one variety yielded the maximum amounts of biomass ( $6.18 \pm 0.73$  g/plant), total carotenoids ( $217.50 \pm 5.6$  mg/100 g DW), and  $\beta$ carotene (73.64

from the fruits and aerial parts. These lipids are rich in petroselinic acid. Coriander becomes more valuable and intriguing when petroselinic acid is present.

As the primary omega-12 fatty acid found in coriander oil, petroselinic acid (18,1n-12) is categorized as monounsaturated. It is a positional isomer of octadecenoic acid, with its double bond located in position 6 rather than 9. In coriander oil, petroselinic acid has been found at a concentration of 68–83%, or 65–70%–80.9%. Changes in the fatty acids of coriander fruits growing in the northeast of Tunisia (Charfine) were examined in a study. Petroselinic acid ( $80.9 \pm 5.7\%$ ) was the predominant fatty acid at full maturity, with linoleic acid ( $13.6 \pm 2.9\%$ ), palmitic acid ( $3.6 \pm 0.1\%$ ), and stearic acid ( $0.7 \pm 0.1\%$ ) following closely behind. Saturated and polyunsaturated fatty acids greatly decrease as coriander fruit ages, whereas monounsaturated fatty acids rise.

$\pm 0.3$  mg/100 g DW). Comparing microwave and oven drying methods for leaves, the findings indicate that trans- $\beta$ carotene and pigments are better preserved by microwave drying. Of the carotenoids found in the coriander ether extract,  $\beta$ -carotene accounted for 61.14%. Other carotenoid concentrations included lutein5,6epoxide, violaxanthin, and neoxanthin.

### Isocoumarins

There aren't any recent publications on coriander's isocoumarins. The aerial portions of *C. sativum* were used to isolate the isocoumarins, coriandrones A and B, coriandrin (Figure 6), and dihydrocoriandrin. Furthermore, coriandrones C–E were also separated from methanolic extracts of the coriander aerial parts grown in the Osaka University of Pharmaceutical Sciences botanical garden. The photoactive components of coriander extracts were examined using photobiological test and HPLC. Similarly, photoactivefuroisocoumarins with the names coriandrin and dihydrocoriandrin were also isolated, and X-ray crystallography and <sup>1</sup>H and <sup>13</sup>C NMR were used to determine their structures.

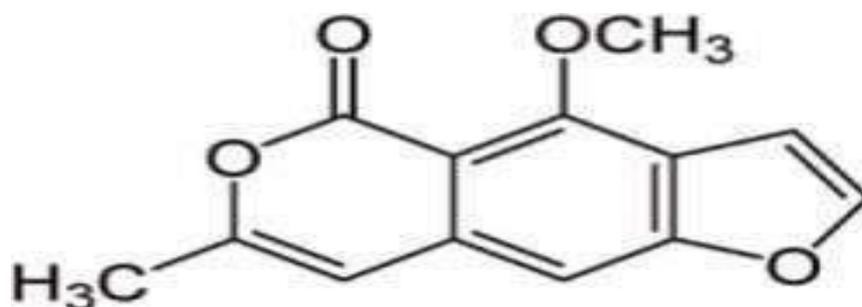
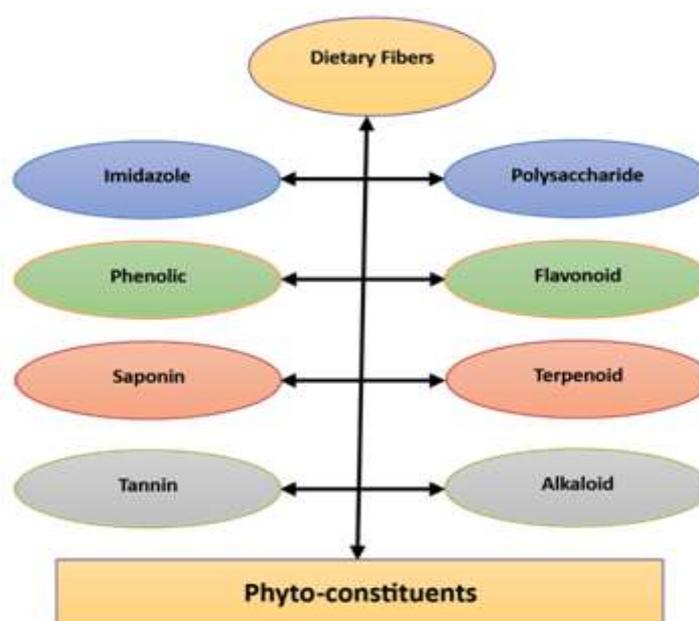


Figure 6. The structure of coriandrin.



### Uses and biological activity of coriander

The Flavor and Extract Manufacturers Association, the Council of Europe, and the Food and Drug Administration (FDA in the USA) have all approved the use of coriander in food. The plant is mostly used in the culinary, beverage, and pharmaceutical industries as a raw material, spice, and medication. In order to model and design heat and mass transfer processes during storage and other potential operations—which are essential in the food and chemical industries—the microwave-drying characteristics of coriander leaves were investigated. Furthermore, the spray-dried approach of encapsulating the 400 nm–7 μm coriander essential oil with chitosan derived from crayfish (*Astacusteleodactylus*) waste shells resulted in significantly increased antibacterial and antioxidant activities. As a natural antioxidant and antibacterial agent, the produced product may find use in the food and pharmaceutical industries. Their

popularity as a spice in the culinary world is partly due to their widespread use as a flavoring agent for the deliciously fragrant scent of their fruits, leaves, and stems. For this reason, in addition to being used in baked goods, drinks, candies, chewing gum, tobacco products, sauces, preservatives, and other meat products, it is also a necessary component of curry powder. However, it's important to remember that coriander and its oil are specifically utilized in cosmetics and perfumes. Coriander oil's warm, pleasant notes combined with other flower notes for an oriental. It is utilized in aromatherapy, soaps, lotions, creams, and perfumes in addition to masking the taste of several medications. While the entire young plant is used to make chutneys, the leaves are used to flavor soups, sauces, and curries. While fresh leaves and dried fruits are the most commonly utilized components of *Coriandrum sativum*, all parts are edible and used as a spice in daily life. It is said

that green leafy vegetables are used in salads because they are high in proteins, vitamins, minerals (including calcium, phosphorus, and iron), fibers, and carbs. Although coriander fruits are well-known for their health-promoting properties as healing spices, coriander essential oil can be sold as a food supplement

### Biological activities and usages of the coriander

The Flavor and Extract Manufacturers Association, the Council of Europe, and the Food and Drug Administration (FDA in the USA) have all approved the use of coriander in food. The plant is mostly used in the culinary, beverage, and pharmaceutical industries as a raw material, spice, and medication. In order to create and model heat and mass transfer processes during storage and other potential operations, which are required in the food and chemical industries, the microwavedrying characteristics of coriander leaves were studied. Furthermore, the spray-dried method of encapsulating the essential oil of coriander (400 nm–7  $\mu$ m) with chitosan derived from the waste shells of crayfish (*Astacuseptodactylus*) produced significantly higher antioxidant and antimicrobial activity than the oil and pure chitosan alone. As a natural antioxidant and antibacterial agent, the produced product may find use in the food and pharmaceutical industries. Because of their widespread usage as a flavoring agent for the pleasant aromatic scent of their fruits, leaves, and stems, one of the reasons they are well-known as spices in the culinary world. This is the reason it's utilized as a preservative, condiment, chewing gum, baked goods, beverages, candies, and other meat products in addition to being a necessary component of curry powder. However, it's important to remember that coriander and its oil are specifically utilized in cosmetics and perfumes. When combined with other floral notes, the warm, sweet tones of coriander oil create a different kind of impression in oriental-style perfumes. It is utilized in aromatherapy, soaps, lotions, creams, and perfumes in addition to masking the taste of several medications. While the entire young plant is used to make chutneys, the leaves are used to flavor soups, sauces, and curries. While fresh leaves and dried fruits are the most commonly utilized components of *Coriandrum sativum*, all parts are edible and used as a spice in daily life. It is said that green leafy vegetables are used in salads because they are high in proteins, vitamins, minerals (including calcium, phosphorus, and iron), fibers, and carbs. The essential oil of coriander can be sold as a food supplement with a daily

maximum dosage of 600 mg, despite the fact that coriander fruits are well-known for their health-promoting properties as healing spices. However, the fruits have a high concentration of lipids (fatty acids) (28.4%), which could be crucial for the food business. Valuable fatty acids found in coriander fruits include pepselinic acid (18:1), linoleic acid (18:2), oleic acid (18:1), and palmitic acid (16:0). One significant fatty acid that exhibits significant biological consequences is petroselinic acid. It has the ability to reduce arachidonic acid in the rat heart and liver and markedly boosted the production of anti-inflammatory precursor and decreased pro-inflammatory precursor. The overproduction of arachidonic acid has been limited when petroselinic acid was given orally.

It may also be used as a competitive inhibitor of topoisomerases and possesses antibacterial qualities, making it a promising candidate for cancer therapy. Topoisomerases alter DNA structure and are involved in the development of a number of proliferative disorders. Furthermore, the primary constituent of coriander essential oil, linalool, possesses various health benefits such as antioxidant, neuroprotective, anxiolytic, anticonvulsant, migraine relief, analgesic, hypoglycemic, hypolipidemic, and blood pressure reducing properties. Within a month, a coriander fruit ethanolic extract syrup showed notable short-term effects on migraine, including a reduction in the length and frequency of migraine attacks as well as a decrease in pain intensity.

### Antioxidant effects

The antioxidant potencies of polyphenolic compounds from *Coriandrum sativum* against hydro- gen peroxide-induced oxidative damage in human lymphocytes have been investigated in some articles. It was seen that the treatment with polyphenolic fractions (50  $\mu$ g/mL) was increased the activities of antioxidant enzymes (superoxide dismutase, catalase, glutathione peroxidase, glutathione reductase, and glutathione-S-transferase) and glutathione content. On the other hand, it reduced the levels of TBARS significantly. The aqueous coriander extracts (2.734 mg) of total phenolics (catechin equivalents) per 100 g of a dry sample exhibits considerable antioxidant activity according to the  $\beta$ -carotene/linoleic acid model. The caffeic acid (4.34 and 2.64 mg/mL), protocatechuic acid and glycitin (6.43 and 3.27 mg/mL) were found in high concentration in the aqueous extract. Moreover, it seems that subcritical water extraction showed significant improvement comparing the yields of phenolics and flavonoids

obtained with this technique against conventional solid-liquid extraction and modern extraction techniques, such as ultra- sound-assisted and microwaveassisted extraction.

#### Antimicrobial effects

The antimicrobial activity of the coriander has been arisen from the essential oil content. The essential oil of coriander has been exhibited potent antimicrobial activity against oral pathogens, and a dental gel formulation. Moreover, the aqueous extract of coriander was found to have potency against acne-inducing bacteria (MIC values are 1.7 mg/mL for *Propionibacterium acne* and 2.1 mg/mL for *Staphylococcus epidermidis*). The formulations commercially developed for the treatment of acne, showed the same activity. The development of advanced anti-acne formulations, the coriander oil is the good options due to the antibacterial activity. Coriander is also found as an important herbal remedy for its antioxidant, anti-inflammatory, analgesic and antimicrobial properties of diaper dermatitis which is a common dermal disorder.

#### Antidiabetic effects

In many articles, we can find the antidiabetic effects regarding the coriander. In fact, coriander has been confirmed as an antidiabetic remedy. The studies have confirmed the antihyperglycemic effect of coriander in streptozotocin-diabetic mice. The mechanism of action of the antihyperglycemic action of the aqueous extract of the coriander fruits is connected with stimulation of insulin secretion, enhancement of glucose uptake and metabolism by muscle. In general, the effect is generated by one or more components existed in the extract. Therefore, *C. sativum* is acceptable as a possible antihyperglycemic dietary supplement and can be accounted for a potential source of a new orally active agent for diabetes. In another study, a single dose of coriander fruit-extract or glibenclamide suppressed hyperglycemia in obese-hyperglycemic-hyperlipidemic Merionesshawirats. After administration, the insulin resistance significantly decreased in the rats.

Interestingly, the hypoglycemic effect was lower in normal rats, its mean; the test substances reduced plasma glucose, insulin and insulin resistance, cholesterol, LDL-cholesterol, and triglyceride. Moreover, it was observed that a dose of coriander fruit decrease and regulate blood sugar and dyslipidemia at typical traditional doses in the

patients who have noninsulin- dependent diabetes mellitus. In a study of 40 volunteers, 20 subjects took 2.5 g of ground coriander fruit twice daily for 60 days and 20 volunteers served as controls. The treatment group had a significant declining in fasting blood-sugar levels; a significant reduction in lipid peroxidation in red blood cells; and rises in serum  $\beta$ -carotene, vitamin A, vitamin C, vitamin E, and glutathione levels. In addition, the animals in the two groups showed almost similar weight gain, and the diet consumption was similar in both groups. There is a significant decrease in fasting blood glucose level and increase in the concentration of hepatic glycogen in the rats of the experimental group. Hexokinase and phosphoglucomutase activity increased significantly in the liver of rats administered coriander fruits. The glycogen synthase activity in the liver was increased, and that of glycogen phosphorylase showed a decrease in the rats of the experimental group compared to the control group. Significant reduction in glucose-6-phosphatase activity was observed in the experimental group, whereas glucose-6-phosphate dehydrogenase activity showed a significant increase. In this frame, coriander, especially the fruits of the plant found in the receipts can be also acceptable for the treatment of hepatic fibrosis and chronic liver diseases

#### Anxiolytic effects

The aqueous extract of coriander fruits has an anxiolytic activity and may possess sedative and muscle relaxant effects dose-dependently in mice. Its utility in clinical applications may be similar to that of diazepam. The effect of coriander at a dose of 100 mg/kg in mice was found almost equivalent to that of 0.3 mg/kg diazepam on the plusmaze test. According to the studies on animal and on human, 7.5 g dry extract of coriander fruit may be suggested as effective dose for a 75 kg adult man. This corresponds to an infusion of approximately 20 g of coriander fruit in 100 mL water, considering the yield of the extract in the range of the coriander doses, tentatively used in traditional medicine. However, the effect of the extract in a clinical application was not determined to reach the optimum therapeutic dose for a human. For example, the aqueous extract of coriander fruits (200, 400, and 600 mg/kg per day), alcohol extracts (400 and 600 mg/kg per day), and essential oil (600 mg/kg per day) increased pentobarbital-induced sleeping time. In a mouse study, coriander fruits (50, 100, and 200 mg/kg) was compared with diazepam (0.5 mg/kg) in animal models of anxiety.

Coriander fruits were almost recorded equivalent to

diazepam as an anxiolytic at the two higher doses.

### Health Benefits of Coriander



Figure :7

#### Help lower blood sugar :

Oils, extract, and seeds of coriander may all help decrease blood sugar. In fact, coriander lowers blood sugar so much that persons with low blood sugar or those taking diabetes medication should use it with caution.

#### Rich in immune-boosting antioxidants:

Numerous antioxidants included in coriander help guard against the harm that free radicals can do to cells. Its antioxidants are proven to help your body fight inflammation.

#### Benefit for heart health :

Coriander may reduce heart disease risk factors like high blood pressure and LDL (bad) cholesterol levels, according to some research on animals and in test tubes. It seems that coriander extract functions as a diuretic, assisting your body in eliminating excessive water and salt. Your blood pressure can drop as a result.

#### Protect brain health :

Inflammation is linked to a number of brain conditions, such as multiple sclerosis, Parkinson's, and Alzheimer's. The anti-inflammatory qualities of coriander may protect against several illnesses.

#### Fight infections :

Coriander contains antimicrobial compounds that may help fight certain infections and foodborne illnesses.

#### Protect your skin:

Coriander may have several skin benefits, including for mild rashes like dermatitis.

#### Easy to add to your diet :

All parts of the *Coriandrum sativum* plant are edible, but its seeds and leaves taste very different. While coriander seeds have an earthy flavor, the leaves are pungent and citrus-like

#### Coriander in traditional medicine

All portions of this herb are used in folk medicine across several cultures as traditional cures

for various maladies, particularly digestive issues, and as a flavoring agent in food preparation. In areas around the

Mediterranean, the fruits of this herb are highly valued as spices. Greek medicine of Hippocrates (460–377 BC) made use of coriander. Powdered fruits of *C. sativum* can be made into a decoction or tincture and used either by themselves or in conjunction with other herbal remedies to treat dyspeptic problems, appetite loss, convulsions, sleeplessness, and anxiety. Traditional medicine has also traditionally used coriander essential oil.

It was discovered that the essential oil enhanced blood glucose regulation and showed potential as an antihyperglycemic (antidiabetic) substance. Conversely, traditional Moroccan medicine uses the aqueous extract of coriander fruits to treat a wide range of conditions, including diabetes and dyslipidemia, as well as Saudi Arabia and Jordan. Additionally, coriander is used as a traditional diuretic and to cure urinary infections according to Moroccan and Palestinian pharmacopeias. Coriander fruits have long been used as a sedative and an anxiolytic in traditional Iranian medicine for sleeplessness. As usual, the fruits were frequently utilized internally as a digestive, spasmolytic, carminative, and galactagogic. Furthermore, in herbal formulations, it is also recognized as an antiinflammatory agent in Iranian traditional medicine and may be helpful in treating inflammatory bowel illnesses in humans. In India, the highly esteemed Ayurvedic medicinal plant coriander is referred to as "Dhanya." Although the Persian folkloric medicine suggests using coriander leaves to cure diabetes, Ayurvedic medicine also suggests using a decoction of coriander fruits, or seeds, on a daily basis and mentions the fruit's potential benefits for treating inflammatory conditions like arthritis. In any case, it is the primary component of curry powder in Indian cuisine, although Thai and Vietnamese dishes generally use fresh green leaves.

Additionally, coriander roots have been used in Asian cuisine for intense flavour. Furthermore, the plant's "anti-inflammatory" properties have been traditionally employed in various parts of India; in addition, the fruits are used to cure rheumatic fever, leucorrhoea, and spermatorrhea. Recent studies on the cholesterol-lowering properties of coriander have been conducted in the United

States. Furthermore, coriander has long been known as a "antidiabetic" plant in several regions of Europe. The entire plant section is used

in Pakistan to treat a variety of ailments, including vomiting, jaundice, coughing, diarrhea, dysentery, and stomach issues. It's known in Turkey that the fruit infusions work well as an appetizer and for indigestion. But like many other spices, coriander is said to have aphrodisiac properties in historical accounts. Fruit powder is typically used in traditional medicine at a dose of 1 to 5 g, three times per day. This corresponds to a dosage of 43–71 mg/kg for a person weighing 70 kg. The majority of coriander's traditional uses are backed by scientific data as mentioned in the text

### Toxicity of coriander

Rats were not killed by coriander fruits at a dose of 750 mg/kg, and the oil's LD50—the fatal dose at which 50% of test subjects die—was determined to be 4.13 g/kg. On the other hand, implantation in female rats was strongly reduced by high dosages of coriander fruits (500 mg/kg), and the rats showed a slight abortifacient impact (but no teratogenic effect). A dried leaf extract exhibited mutagenic properties in the Ames test. In the range of concentrations evaluated (50–1000 µL/coincubation flask), coriander juice extracts were not hazardous or mutagenic; the total juice extracts' chlorophyll content was 0.0325 µg/mL.

### III. CONCLUSION

Understanding the biological mechanisms underlying the growing interest in natural goods such as essential oils will be crucial to the development of novel applications in the fields of environmental protection, agribusiness, and human health. Essential oils have the potential to be used in a wide range of industries, including the food, pharmaceutical, and cosmetics sectors. This compilation provides updated information on the value of coriander, with a focus on its essential oils and scientific investigations. As an aromatic plant, coriander is a well-known spice, edible herb, and harmless to people. The remarkable phytochemicals in coriander are responsible for its therapeutic effects. Coriander has a great future ahead of it, thus it is important to take these potentials and its biomolecules into consideration. Coriander has a great future ahead of it, thus it is important to take these potentials and its biomolecules into consideration. In addition to many other well-known health advantages that are mostly backed by scientific studies, coriander fruits have a reputation for being extremely healthful and rank near the top of the list of healing spices. Their essential oil is also rich in beneficial

phytonutrients. The benefits of coriander's other uses are astounding, but the knowledge about them is still unclear. By the way, the plant still merits further study and use due to the fascinating essential and fatty oil combination in a miraculous proportion in the fruit composition. Last but not least, it is highly advised that coriander be included in diets since it is an extremely safe herb.

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