



MIRACULOUS HEALTH BENEFITS OF CUMIN (*CUMINUM CYMINUM L.*)

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Abstract

Cumin is most widely used for culinary and medicinal purposes. It is generally used as a food additive and flavoring agent in many cuisines. Cumin has also been widely used in traditional medicine to treat a variety of diseases, including hypolipidemia, cancer, and diabetes. The literature presents ample evidence for the biological and biomedical activities of cumin, which have generally been ascribed to its content and action of its active constituents, such as terpenes, phenols, and flavonoids. The present paper provides an overview of phytochemical profile, biological activities, and ethnomedical and pharmacological uses of Cumin.

Keywords

Cuminaldehyde, Thymol, Pyrazines, Thymoquinone, Insomnia, Bronchitis, Lactation, Anticarcinogenic activity, Hypolipidemia.

INTRODUCTION

Cumin (*Cuminum cyminum L.*) is a small annual and herbaceous plant belonging to the Apiaceae family. It is a multipurpose plant species cultivated in the Middle East, India, China, and several Mediterranean countries, including Tunisia. Dubbed as the second most popular spice in the world (next to black pepper), cumin comes from a small flowering herbaceous plant from the Apiaceae or Umbelliferae family, which also includes parsley, fennel and hemlock. It is native to Asia, Africa, and Europe, but it is widely used in cooking throughout the world. It is the second most popular spice after black pepper. The plant, which grows about 1 to 2 feet tall, is actually native to the Middle-East Asian region, but is now grown all over the world. The aromatic seeds are the part of the plant that's most widely utilized. These cumin "seeds," which are actually the plant's small dried fruits, look very similar to caraway seeds. They're yellow-brown, oblong-shaped and longitudinally ridged. Today, cumin is a spice that's highly valued in different cuisines. Mexicans, Indians and North Africans love using it to add color and flavor to their dishes. Cumin is also a primary component of curry powder, blended with other herbs and spices. [1-2] Cumin seeds' health benefits mainly come from their phyto-

chemicals, which are touted to have carminative, antioxidant and anti-flatulent properties. Cumin is a good source of energy, vitamin A, C, E and B6, thiamine, riboflavin, niacin, antioxidant carotenoids lutein, zeaxanthin and minerals like iron, manganese, copper, calcium, magnesium, phosphorus, and potassium. This spice also works as an expectorant that loosens mucus and phlegm in the respiratory tract. One curious characteristic of cumin is that although it's a stimulant, it can also work as a relaxant, making it potentially helpful for alleviating insomnia. [2-4] Research is still ongoing, but animal studies found that cumin may help reduce the risk of hypoglycemia. Cumin may have anticancer properties, as it stimulates the secretion of chemopreventive and detoxifying enzymes from the glands. This study provides scientific support for the anti-stress, antioxidant, and memory-enhancing activities of cumin extract and substantiates that its traditional use as a culinary spice in foods is beneficial and scientific in combating stress and related disorders. Because of its strong aroma, only a small amount of cumin essential oil is used in recipes to provide these with a powerful punch. Cumin essential oil is also attributed to its bactericidal, carminative, digestive, diuretic and antiseptic properties for numerous other benefits. It is

also rich in protein and amino acids, carbohydrates, dietary fiber and a reasonable amount of fats & fatty acids. Cumin is known for the benefits it offers, more than its taste or flavor,

as it helps in losing weight, improving digestion and immunity, and treating skin disorders, boils, piles, insomnia and respiratory disorders. [5-6]



Fig. 1: Cumin herb and Inflorescence.

Phytochemistry

Phytochemical analysis showed that *Cuminum cyminum* contained: alkaloid, anthraquinone, coumarin, flavonoid, glycoside, protein, resin, saponin, tannin and steroid. Nutrient contents of cumin (in 2 g of seeds) were included: calories 7.50, calories from fat 4.00, calories from saturated fat 0.28, protein (g) 0.36, carbohydrates (g) 0.88, dietary fibre (g) 0.22, total fat (g) 0.44, saturated fat (g) 0.04, monounsaturated fat (g) 0.28, polyunsaturated fat (g) 0.06, water (g) 0.16, Ash (g) 0.16, vitamin A (IU) 25.40, vitamin A (RE) 2.54, α -carotenoid (RE) 2.54, beta carotene (μ g) 15.24, thiamin – B1(mg) 0.02, niacin – B3(mg) 0.10, niacin equiv 0.10, vitamin C 0.16, vitamin E alpha equiv 0.02, vitamin E (IU) 0.04, vitamin E (mg) 0.02, folate(μ g) 0.20, vitamin K (μ g) 0.11, calcium(mg) 18.62, copper(mg) 0.02, iron(mg) 1.32, magnesium (mg) 7.32, manganese (mg) 0.06, phosphorus (mg) 9.98, potassium (mg) 35.76, selenium(μ g) 0.10, sodium (mg) 3.36, zinc (mg) 0.10, palmitic acid (g) 0.02, oleic (g) 0.28, linoleic acid (g) 0.06 and omega 6 fatty acids (g) 0.06. Organic acids (aspartic, citric, malic, tartaric, propionic, ascorbic, oxalic, maleic and fumaric acids) were isolated from seeds of *Cuminum cyminum*. Cumin fruits contained 2.5 to 4.5% volatile oil and 10% fixed oil. It appeared that the constituents of *Cuminum cyminum* essential oil were differ according to the area from which the *Cuminum cyminum* samples were taken. The major compounds in the Turkish cumin (*Cuminum cyminum*) seed oil were cuminaldehyde (19.25-27.02%), p-mentha-1,3-dien-7-al (4.29-12.26%), p-mentha-1,4-dien-7-al (24.48-44.91%), γ -terpinene (7.06-14.10%), p-cymene (4.61-12.01%) and β -pinene (2.98-8.90%). Cuminaldehyde, γ -terpinene, o-cymene, limonene and β -pinene were determined to be the major constituents of Syrian *Cuminum cyminum*. The major compounds in cumin essential oil of Egyptian cultivars were cuminaldehyde (35.25%), tetradecene (12.25%), γ -terpinene (12%), β -ocimene (9.72%), p-mentha-2-en-ol (9%), α -terpinyl acetate (5.32%), α -terpinolene (3%), limonene (0.5%), myrcene (0.2%), β -pinene (0.9%) and α -pinene (0.19%). Tunisian variety of *Cuminum cyminum* contained cuminaldehyde (39.48%), gamma-terpinene (15.21%), Ocymene (11.82%), beta-pinene (11.13%), 2-carene-10-al (7.93%), trans-carveol (4.49%) and myrtenal (3.5%) as major components. Analysis of the fruit oil of *Cuminum cyminum*

from Delhi showed that the major constituents were transdihydrocarvone (31.11%), γ -terpinene (23.22%), p-cymene (15.8%), α -phellandrene (12.01%) and pmenth-2-en-7-ol (3.48%) and cuminaldehyde constituted only 0.58%. Analysis of cumin oil samples from four different German regions showed that the major compounds in all samples were monoterpenes beta -pinene, p-cymene, gamma -terpinene, the terpenoid aldehydes, cuminaldehyde and the isomeric menthadien carboxaldehydes. However, Li and Jiang found that Chinese cumin seed oil contained cuminal (36.31%), cuminal alcohol (16.92%), γ -terpinene (11.14%), safranal (10.87%), p-cymene (9.85%) and β -pinene (7.75%) as major components. Thymol (40.65%), γ -terpinene (24.51%), β -pinene (5.38%), α -pinene (3.47%), camphene (2.31%), terpinene-4-ol (2.00%), cuminaldehyde (1.79%), a-thujene (1.45%), α -terpinolene (1.17%), myrcene (1.07%), limonene (1.04%), α -phyllanderene (0.94%), acetoxylinalool (0.57%) and sabinene (0.37%) represented the major components isolated from cumin essential oils from Kurdistan mountain of Iran(91). 20 compounds from the *Cuminum cyminum* (seeds) oil including: α -pinene 2.14, sabinene 1.01, β -pinene 4.89, β -myrcene 1.45, α -terpinene 0.84, p-cymene 1.77, limonene 0.24, -terpinene 1.07, α -terpinolene 0.08, Camphor 0.12, Terpinene-4-ol 0.04, α -terpineol 2.47, geraniol 0.07, geranyl acetate 4.11, β -caryophyllene 3.44, α -phellandrene 1.09, cuminaldehyde 60.01, thymol 2.04, β -farnesene 3.01 and caryophyllene oxide 6.12. However, 32 compounds from *Cuminum cyminum* oil including: isobutyl isobutyrate 0.8, a-thujene 0.3, α -pinene 29.1, sabinene 0.6, myrcene 0.2, d-3-carene 0.2, p-cymene 0.3, limonene 21.5, 1,8- cineole 17.9, (E)-ocimene 0.1, γ -terpinene 0.6, terpinolene 0.3, linalool 10.4, a-campholenal 0.03, transpinocarveole 0.07, d-terpineole 0.09, terpinene-4-ol 0.5, a-terpineole 3.17, trans-carveole 0.4, cis-carveole 0.07, geraniol 1.1, linalyl acetate 4.8, methyl geranate 0.2, a-terpinyl acetate 1.3, neryl acetate 0.09, methyl eugenol 1.6, β -caryophyllene 0.2, a-humulene 0.2, spathulenol 0.07, caryophyllene epoxide 0.1, humulene epoxide II 0.08 and acetocyclohexane dione-2 0.4(93). 49 components were identified in the essential oil constituents of the *Cuminum cyminum* fruit grown in Delhi, which represented 99.78% of total detected constituents. The essential oil was characterized by the presence of

monoterpene (79.61%), sesquiterpene (2.66%), aromatic (16.55%) and aliphatic compounds (0.66%). Among thirty four monoterpenes detected, there were fourteen hydrocarbons (41.28%), twelve alcohols (5.76%), six keto

compounds (31.92%), one aldehyde (0.54%) and two esters (0.11%). The predominant monoterpene hydrocarbon was γ -terpinene (23.22%) followed by α -phellandrene (12.01%), α -pinene (1.78%) and α -terpinene (1.24%).

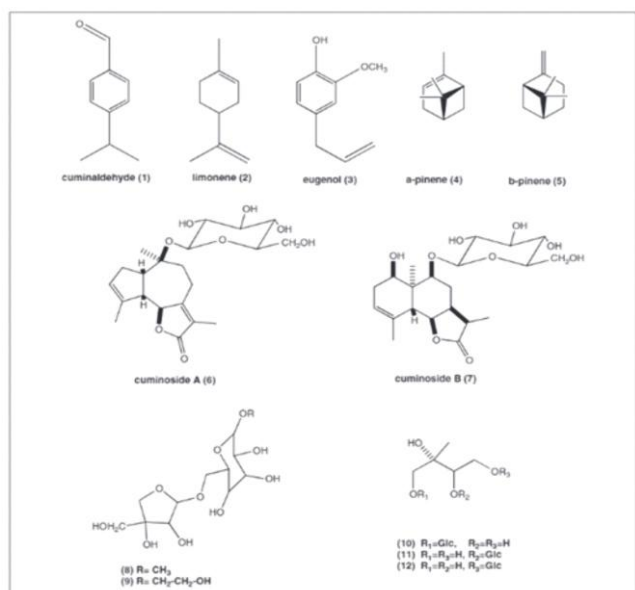


Fig. 2: Structures of phytoconstituents in Cumin.

Among twelve monoterpene alcohols, p-menth-2-en-7-ol (3.48%) was the major alcoholic constituent and trans-dihydrocarvone (31.11%) was the prominent monoterpene ketone in the essential oil. The sesquiterpenes identified in the oil were teresantalol (2.62%) and karvankol (0.04%). The aromatic compounds detected were p-cymene (15.87%), 8-methyl octahydro-2(1H)-naphthalenone, 2-isopropyl-5-methyl phenol, p-cymen-7-ol, o-cymen-5-ol, p-cymen-3-ol, 6-allyl-4,5-dimethoxy-1,3-benzodioxole and 2, a, 8, 8-tetramethyl decahydrocyclopropanal [d] naphthalene. The aliphatic compounds included 1-(1, 2, 3-trimethyl-2-cyclopenten-1-yl) ethanone, 3-isopropyl phenol, 2-methyl-4-isopropylidene-cyclopentan-1-al, 1-methyl-4-isopropyl-3-cyclohexen-1-ol, 2-isopropenyl-5-methyl-hex-4-enal, 4-isopropyl cyclohex-1,3-dien-1-yl) methanol, 4-isopropyl-1-cyclohexen-1-carbaldehyde, hexadecylene oxide and (3,4-dimethyl-2-oxo-cyclopenten-1-yl) acetic acid(88). Analysis of the methanolic extract of the fruits of *Cuminum cyminum* led to the isolation of five terpenic and steroidal constituents, they were characterized as 1,4,5,8-tetrahydroxynaphthyl geranil-10-yl 1-oate, lanost-5,20(22)-dien-3 α -olyl ndocosanoate, labdan-6 α ,16,20-triol-16-(10,11-dihydroxy anthraquinone-2-oate), stigmast-5-en-3 β -O-D-arabinopyranosyl-2-benzoate and lanost-5,24-dien-3 β -ol 3 β -O-D-arabinopyranosyl-2-noctadec-9,12-

Structure	Name	Formula	Structure	Name	Formula
	Limonol	C ₁₀ H ₁₆ O		β -Pinene	C ₁₀ H ₁₆
	Cinnamaldehyde	C ₉ H ₈ O		Δ^2 -Carene	C ₁₀ H ₁₆
	Limonene	C ₁₀ H ₁₆		p-Cymene	C ₁₀ H ₁₄
	α -Pinene	C ₁₀ H ₁₆		α -Terpinol	C ₁₀ H ₁₆ O

dienoate. The characteristic odour of cumin was attributed to the presence of cinnamaldehyde, 1, 3-p-menthadien-7-al, 1-4-pmenthadien-7-al. 14 free amino acids were also isolated from the seeds. While, flavonoid glycosides isolated from the plant were included apigenin-7-glucoside, luteolin-7-glucoside, luteolin-7-glucuronosyl glucoside, luteolin and apigenin. Total polyphenols in cumin were 4.98 \pm 0.31. (mg GAE/g DW). Phenols (salicylic acid, gallic acid, cinnamic acid, hydroquinone, resorcinol, p-hydroxybenzoic acid, rutin, coumarin, quercetin) were isolated from seeds of *Cuminum cyminum*. However, *Cuminum cyminum* roots, stems and leaves, and flowers were investigated for their total phenolics, flavonoids, and tannins contents. In all *Cuminum cyminum* organs, total phenolics content ranged from 11.8 to 19.2 mg of gallic acid equivalents per gram of dry weight (mg of GAE/g of DW). Among the polyphenols studied, 13 were identified in roots, 17 in stem and leaves, and 15 in flowers. The major phenolic compound in the roots was quercetin (26%), whereas in the stems and leaves, p-coumaric, rosmarinic, trans-2-dihydrocinnamic acids and resorcinol were predominant. In the flowers, vanillic acid was the main compound (51%). A total of 19 phenolic compounds were successfully identified during the ripening of cumin seeds. Rosmarinic acid was the major phenolic acid for the unripe seeds, while, half ripe and full ripe seeds were dominated by p-coumaric acid. [5-20]



Fig. 3: Images of cumin seeds and powder.

Traditional Health Benefits

Cumin is extremely good for digestive problems. The very

aroma, which comes from an organic compound called Cinnamaldehyde, the main component of its essential oil,

activates the salivary glands in our mouth, which facilitates the primary digestion of food. Next is thymol, a compound present in cumin, which stimulates the glands that secrete acids, bile, and enzymes responsible for complete digestion of the food in stomach and intestines. Cumin is also carminative, which means that it relieves you from gas troubles, and thereby, improves digestion and appetite. Due to its essential oils, magnesium, and sodium content, cumin promotes digestion and also gives relief from stomach-aches when taken with hot water. The main cause behind piles (hemorrhoids) is constipation added with infections in the wound in the anal tract, which is also caused by constipation. Cumin because of its dietary fiber content, and carminative, stimulating, antifungal and antimicrobial properties, acts as a natural laxative in powdered form. These characteristics are due to the presence of essential oils comprised mainly of cuminaldehyde and certain pyrazines. [4-6] It is important to note that it is capable to clear up all of the symptoms and causes of hemorrhoids. Although research is still ongoing, early studies report that cumin, among a number of other spices, can have a powerful effect in preventing diabetes by reducing the chances of hypoglycemia. The animals that were tested showed a sharp decline in hypoglycemia when fed cumin seeds in their diet. They also showed a decrease in glucosuria, which is a condition where the urine contains too much glucose, also resulting in hypoglycemia and diabetes. Some of the components of cumin essential oil are hypnotic in nature and have tranquilizing effects, which also help to relieve stress and anxiety that commonly cause insomnia. The presence of caffeine (the stimulating agent), and the richly aromatic essential oils (the disinfectants) make cumin an ideal anti-congestive combination for those suffering from respiratory disorders such as asthma and bronchitis. It acts as an expectorant, meaning that it loosens up the accumulated phlegm and mucus in the respiratory tracts, and makes it easier to eliminate those from the system via sneezing or coughing up and spitting. The common cold is a viral infection which affects our body frequently when our immune system becomes weakened. Again, the essential oils present in cumin act as disinfectants and help fight viral infections which can cause the common cold. Cumin also suppresses the development of coughing in the respiratory system since it dries up the excess mucus. Cumin is rich in iron and has a considerable amount of vitamin C, which is essential for a healthy immune system and keeps infections from forming or becoming worse. Cumin is rich in iron and thus very good for lactating mothers or pregnant women, as well as for women who are undergoing menses. Moreover, cumin is said to help ease and increase secretion of milk in lactating women due to the presence of thymol, which tends to increase the secretions from our glands, including milk, which is a secretion from the mammary glands. Also, cumin is more beneficial if taken with honey. Cumin has a remarkable amount of calcium (> 900 mg/100 grams) which accounts for over 90% of our daily requirement of calcium. This calcium is an important constituent of milk and hence cumin is very good for lactating mothers. As stated above, cumin is very rich in iron (> 66 mg/ 100 grams) which is more than 5x the daily requirement of iron for an adult. [5-7] So, cumin can be a nutritious additive to the daily diet of anemic people. It can help reduce the symptoms of anemia like

fatigue, anxiety, cognitive malfunction, and digestive issues. The amount of iron in cumin leads to an increased hemoglobin production and subsequent prevention of anemia, but the increased blood flow has other benefits as well. When your blood circulation is at its best, adequate amounts of oxygen are able to reach the organs and the brain, leading to an optimal performance of those bodily systems. The Proper amount of oxygen and iron in the brain lead to increased cognitive performance and a decrease in cognitive disorders like Alzheimer's disease and dementia. Almost everyone knows that vitamin-E is good for the maintenance of skin and the prevention of premature aging symptoms. It keeps the skin young and glowing. This vitamin is also present in abundance in cumin. The essential oils present in cumin have disinfectant and antifungal properties. This prevents any microbial and fungal infection from affecting the skin. Not all skin issues are disorders or infections, some of them are simply signs of aging. Vitamin E acts as an antioxidant in this regard and combats the free radicals that attack the skin and result in signs of premature aging like wrinkles, age spots, and sagging skin. This, combined with the antibacterial capacity of cumin, makes for healthy, beautiful skin that lasts far into your old age. Boils are outlets for the removal of toxic substances and foreign matters such as microbes from the body. This means that they are the symptoms which show that a high amount of toxic substances have accumulated in the body. Those who regularly use cumin in food have a significant reduction in the occurrence of boils, rashes, pimples, and other signs of excess toxin content. Components such as cuminaldehyde, thymol, and phosphorus are good detoxifying agents which help in the regular removal of toxins from the body. The healthy way of removing toxins is through the excretory system, not through boils. As discussed above, an abundance of iron, the presence of essential oils, vitamin C, and vitamin A in cumin boosts our immune system in a number of ways. Vitamin C is one of the most powerful antioxidants that we have in our body, and it stimulates the function and activity of white blood cells. [8-11] As an antioxidant, vitamin C fights the detrimental effects of free radicals, which are the dangerous byproducts of cellular metabolism. They are constantly being created in the body, and therefore, must be eliminated. Antioxidants neutralize free radicals that lead to many diseases, including, but not limited to, cardiovascular diseases and cancer. Cumin itself has detoxifying and chemo-preventive properties, and accelerates the secretion of detoxifying and anti-carcinogenic enzymes from the glands, as it also does to other secretions. Furthermore, it has beneficial antioxidants like vitamin C and vitamin A within its chemical makeup, in addition to those essential oils. Besides having countless other benefits, the antioxidants have anti-carcinogenic properties too, and those found in cumin are particularly good for colon cancer prevention. [12-20]

Culinary Uses

Spices play an important role in making a dish more flavorful. Indian cuisine is especially known to have some of the healthiest traditional spices as its main ingredients. Cumin is one such spice that forms an integral part of various dishes in the Indian cuisine. Cumin is traditionally used as a spice in Indian cooking, either as whole seeds or in powdered form. It

is a major component in a curry's preparation and other food products. Derived from cumin seeds, this oil is used as a scent in cosmetics including creams, perfumes, and lotions. It is used to add flavor to alcoholic beverages and desserts. Cumin seeds are used to make medicines that help in treating problems like diarrhea, colic, inflammation, bowel and muscle spasms and gas. When ground cumin is mixed with honey and pepper, it works as an aphrodisiac.

DISCUSSION AND CONCLUSION

Besides its culinary uses, this aromatic spice is known for its medicinal properties since ancient times. Being an excellent source of iron, it aids in digestion, boosts the immune system and has anti-carcinogenic properties. Black cumin seeds contain about 100 chemical compounds including vitamins, proteins, carbohydrates, minerals and fatty acids. They are known for their healing qualities. Thus, this spice has a rich history and was particularly favored by the ancient Egyptians, Greeks and Romans. Regular usage of cumin in your food helps in keeping your skin free from boils, rashes, pimples etc. This is because it has components such as Cuminaldehyde, Thymol and phosphorus which are good detoxifying agents. Cumin has a high content of vitamin E which keeps your skin healthy and glowing. Besides, the essential oils, cumin have disinfectant and anti-fungal properties which protect your skin from fungal and microbial infections. Cumin is also a good source of dietary fiber which helps in the cleaning process and removes toxins. Vitamin E present in cumin triggers the anti-ageing processes within the body, thus preventing pre mature ageing symptoms. It acts as an antioxidant to combat the free radicals that attack the skin and cause signs of ageing like wrinkles, age spots and sagging skin. Oil extract from cumin is a great stimulant, carminative, antioxidant and diuretic. It is often used for massage in aromatherapy and scalp treatments to get rid of dandruff. Cumin helps to lower blood sugar levels and thus helps in maintaining proper blood content levels in the body. This is a great boon for people suffering from Diabetes. Cumin seeds are very rich in iron, which makes it an essential natural health ingredient. Cumin seeds contain Thymoquinone, which reduces inflammatory processes and other mediators that cause asthma. They also act as a bronchodilator. This is achieved by its anti-oxidant characteristics that fight against impurities and free radicals. This helps in making the body's immunity better in combating diseases. Cumin seeds are rich in iron which is necessary for the formation of haemoglobin in the blood. This in turn is required for the transportation of oxygen in the body. Consuming cumin seeds will keep one protected from anaemia. Cumin is healthy for women of all age groups and is known to influence a healthy menstrual cycle. Cumin is helpful in treating colon and breast cancer. The seeds contain thymoquinone, dithymoquinone, thymohydroquinone and thymol which are anti-carcinogenic agents. Cumin is rich in Vitamin C and has anti-fungal properties. These help to cure cold and other respiratory problems. Cumin seeds are also suggested for kidney health. Good metabolism process helps to keep all the other body processes in check. Iron present in cumin helps to properly maintain our metabolic activity. Enzymes present in cumin help to breakdown foods and thus aid in digestion. In traditional medicine, cumin was used to treat hoarseness,

jaundice, dyspepsia and diarrhoea. Its seeds were used for stomachic, diuretic, carminative, stimulant, astringent and abortifacient properties. The oil of cumin was used in perfumery and as a seasoning in curry powders, soups, stews, sausages, cheeses, pickles, meats and chutneys. In America, Africa and India the drug is used as an abortive and as an emmenagogue. In Indonesia, it was used in cases of bloody diarrhea and headache (paste is applied to the forehead). It was also taken orally for rheumatic ailments. In India, cumin was used as an abortifacient, for kidney and bladder stones, chronic diarrhea, leprosy and eye disease. In Unani system of medicine, the fruits of *Cuminum cyminum* were used as an astringent, carminative, emmenagogue, for the treatment of corneal opacities, ulcers, boils, styes and to relieve cough and inflammation. Phytochemical analysis showed that *Cuminum cyminum* contained: alkaloid, coumarin, anthraquinone, flavonoid, glycoside, protein, resin, saponin, tannin and steroid. The previous pharmacological studies revealed that *Cuminum cyminum* exerted antimicrobial, insecticidal, anti-inflammatory, analgesic, antioxidant, anticancer, antidiabetic, antiplatelet aggregation, hypotensive, bronchodilatory, immunological, contraceptive, anti-amyloidogenic, anti-osteoporotic, aldose reductase, alpha-glucosidase and tyrosinase inhibitory effects, protective and central nervous effects. This review highlights the chemical constituents and pharmacological effects of *Cuminum cyminum*.

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