

A Review on Health Benefits of Indian Spices

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ABSTRACT: Seed spices are an important category of agricultural commodities that contribute significantly to our country's economy. India has long been known as a spice-producing country. Coriander, cumin, and fennel are members of the umbelliferon family, whereas fenugreek belongs to the Fabaceae family. Bioactive compounds, also bioactive constituents, are occurs naturally, physiologically active phytochemicals that operate as a natural defence mechanism for host plants or have previously been exploited as medications, perfumes, or taste components. They're a gold mine of opportunities in our search for useful bioactive molecules for pharmacotherapy or other wellness issues. Seed spices affect a number of biological systems, such as the digestive, circulatory, reproductive, or neurological systems, causing a range of metabolic but also physiologic consequences. Antioxidants, antidiabetic, anticancer, antimicrobial activity, hypolipidemic influence, insecticidal, beneficial in heavy menstrual bleeding, aiding digestion, high blood pressure, instrumentation of enzymes involved, immune function, reduction of inflammatory process, molecular mechanism, modulations of immune systems, The purpose of this research is to have a thorough analysis on the present trends in research here on health advantages of four common seed seasonings: cumin, coriander, but also fennel.

KEYWORDS: Antioxidant, Cumin, Coriander, Nutraceuticals, Seed spices.

I. INTRODUCTION

Spices have long been recognized as medicinal foods. Spices' ability to transmit biological activity is progressively resurfacing as a topic of study in humans health. Seeds spice are an significant category of the farming commodities that contribute significantly to our country's economy. India has long been known as a spice-producing country. Rajasthan or Gujarat have supplied more than 81% of country's total seed spice productions. Coriander, cumin, fennel, and fenugreek are the main seed spices, while ajowan, dill, caraway (siah jeera), celery, nigella (kalonji), or anise are minors seeds spices. Secondary metabolite, also known as phytochemical, are contains natural, physiologically active rich in phytochemicals that operate as a natural defence mechanism for host plants and have previously been

exploited as medications, perfumes, dyes, taste compounds, or agrochemicals. Utilizing current biological as well as computer science technology, chemo bioinformatics will assist in the development of novel drugs. These metabolites are still a significant source of novel medicines today. In our quest for the helpful bio actives chemicals for pharmacology or other health related problems, they're a treasure mine of possibilities. India now exports herbal raw ingredients and medicines worth US\$ 110-114 million per year. Cheminformatics offers up new avenues for pharmaceutical companies to investigate seed spices as gold mines. Organic compounds are used to classify alcohols, amines, aldehydes, esters, ethers, terpenes, ketones, thiols, or other miscellaneous compounds. Spices include essential oil that make up these elements. The major driving forces for the development of the worldwide phytochemical business are population demographics, increasing emphasis on health vs illness, push toward self-cares or self-diagnosis, and rising consumer awareness of traditional medicines. These metabolites are now a significant source of the novel medicine. Plant-derived compounds have lately attracted a lot of attention due to their wide ranges of uses. The purpose of this study is to compile a study on the present state of knowledge on the potential health advantages of four common seed spices: cumin (*Cuminum cyminum* L.), coriander (*Coriandrum sativum* L.), & fennel (*Foeniculum vulgare* L.) (*Foeniculum vulgare* Mill.) [1-3].

II. MEDECINAL BENEFITS OF CUMIN

Cumin is a seed spice that belongs to the umbelliferae family of plants. Food flavouring and aroma are made using cumin including cumin-derived values added goods. Cumin contains volatile oil (4–5%), the major active ingredient of which is cuminaldehyde, a prominent phytochemical with several health benefits found in quantities of 45 to 50%. The principal constituent is cuminaldehyde, providing gives cumin seeds oil its characteristic odour [4,5].

A. Antioxidants Activity

Cumin seed contains antioxidants known as apigenin or luteolin, which already have antioxidant qualities. Antioxidant activities have been discovered in the hydrocarbon ethanol soluble portion of cumin.

Cuminaldehyde has been found to have been a scavenger of superoxide anion.

B. Cancer-Preventive Effects

Cumin seeds have been shown to prevent the production of stomach squamous cell carcinomas, indicating that the spice has anticancer properties. Cumin was shown to have a preventive effect against caused colon cancer in rats.

C. Hypoglycemic

Other metabolic changes were reversed by dietary cumin, as shown by decreased bloods urea levels or reduced urea as well as creatinine excretions in diabetic rats. Dietary cumin substantially reduced the increased plasma urea level of diabetic rats by approximately 50%. Cumin is one of the components in a natural antidiabetic medication that has been shown to be beneficial of human trials.

D. Antimicrobial Action

The antibacterial activity of cumin peel essential as well as alcoholic extraction against *Klebsiella pneumoniae* ATCC 13883 but also ceftazidime resistant strains was investigated. Cumin oil but also cuminaldehyde have already been proven to have antibacterial but also larvicidal effects. In the pharmaceutical sector, cumin seeds essential oil but also alcoholic extraction could be used (disinfectant and antiseptic).

E. Platelet Aggregations in Blood

Cumin extraction in ether inhibited arachidonate induced prostaglandin synthesis in human platelet in an amount of the drug way.

F. Dietary Fiber

Dietary fibres, both insoluble or soluble, are really the storing state of polysaccharides found in plant cell walls that cannot be digested by human digestive enzymes. With the exception of a few spices, there seems to be little data on dietary fibre content of spices. Cumin is claimed to comprise 15–45 percent crude fibre. Cumin collection of waste, the with bulk going to boiler feed but just a little quantity going to veterinary feed ingredients. Cumin waste, which has no economic value, was studied for its quality, physicochemical qualities, and use potential as a new functional food ingredient.

III. MEDICINAL BENEFITS OF CORIANDER

Coriander (*Coriandrum sativum* L.), a culinary or medicinal plant from the umbelliferae family, is one of most important spice crops. Coriander is a Mediterranean native that is now widely cultivated for its leaves, seeds, but also essential oils production in several other parts of the world. It is grown in India, Russia, Bangladesh, Pakistan, Central Europe, Morocco, but also China. Coriander seeds and leaves are extensively utilized for different culinary uses and essential oil extraction in India, which is the world's biggest coriander grower [6-9].

A. Antioxidant activity

The antioxidant activity of coriander leaf and seed extracts, as well as coriander oil, was investigated using several bioassay methods, and a significant connection was discovered among total phenolic contents in extract or antioxidant action. The antioxidant activity of coriander leaves was higher than that of the seeds. The levels of generated free radicals in liver of rat fed corianders seeds powder showed a important decrease. Cryogenic grinding technique was shown to be beneficial in retaining the flavor and medicinal qualities of coriander, regardless of genotypes from various origins, with substantial increases in oleoresin content, total phenolic content, flavonoids, and antioxidant characteristics.

B. Hypoglycemic activity

Coriander has been utilised as a traditional diabetes medication since the beginning of civilization. Coriander lowered blood sugar levels in treated group when it was given to their meal. Increased insulin secretion and enhanced glucose uptake and metabolism through muscle are associated to coriander's antihyperglycemic effect, demonstrating the activities of many active components. As a consequence, coriander might be employed as an antihyperglycemic dietary supplement as well as a source of physically active agent(s) in the management of diseases. Coriander possesses insulin releasing, insulin-like, but also antihyperglycemic effects.

C. Hypolipidemic activity

According to the study, cholesterol levels and also the cholesterol to phospholipid ratio decreased while phospholipid levels increased. Coriander protects against by the unfavourable effects of lipoprotein metabolism in preclinical colon cancer. Several of the acids present in coriander, such as linoleic acid, stearic acids, oleic acid, palmitic acids, or ascorbic acid (vitamin C), are beneficial in decreasing cholesterol levels in the blood. Antioxidants also aid in the reduction of cholesterol builds up on the inner surfaces of arteries or veins.

D. Insecticidal action

Cumin farming purposes oil is effective against deposited bugs. Coriander oil offers insecticidal properties against *Callosobruchus maculatus*, a postharvest handling pest.

E. Aflatoxin management

Coriander essential oils inhibits *A. ochraceus* microbial activity but also toxin generation significantly. *Saccharomyces cerevisiae*, *Mycoderma* sp., *Aspergillus niger*, *Lactobacillus acidophilus*, or *Bacillus cereus* are all susceptible to coriander oils.

F. Antibacterial activity

Antibacterial, antifungal, or antioxidant activities were discovered in essential oils isolated from commercial coriander isolates. Coriander essential oils inhibited twenty-five bacterial genera or one fungal species with high levels of inhibition (*Aspergillus niger*).

G. Swelling

Cineole, a volatile oils component, and linoleic acids, a fixed oils components, possess antirheumatic as well as antiarthritic qualities, or are especially beneficial in treating edoema caused by renal failure or anaemia, since some of the components assist in the elimination of excessive fluid and electrolyte.

H. Diarrhea management and digestion

Coriander, in addition to being a tasty appetiser, helps the stomach produce the right enzymes and digestive fluids, as well as promoting digestion and peristaltic activity, owing to its fragrant essential oils. It aids in the treatment of anorexia nervosa. The essential oils of coriander, such as borneol and linalool, help with digestion, liver function, intestinal motility, and diarrhoea alleviation. Antibacterial qualities of components including cineole, borneol, limonene, alpha-pinene, and betaphelandrene make it effective in the treatment of diarrhoea induced by microbial or fungal activity. Chopped coriander leaves are also delicious as an appetiser.

I. Ulcers in the mouth

Citronelol, a component of coriander essential oils, is a powerful antibacterial. Other ingredients offer antibacterial and therapeutic properties, preventing oral ulcers and sores from worsening. They help to cure ulcers and refresh the breath.

J. Small Pox

The small pox is a contagious disease caused by a virus. The antibacterial, anti-infectious, antioxidant, or detoxifying component or acid found in coriander essential oils are abundant. The immune system is also strengthened by the presence of vitamin C and iron. These characteristics aid in the treatment, prevention, and cure of small pox. Pox sufferers will also notice a reduction in discomfort and a calming effect.

K. Menstrual irregularities

It assists correct hormone synthesis by stimulating but also assisting adequate secretion first from endocrine glands, promoting regular menstrual cycles and minimising pains or discomfort during periods.

L. Eye Health

Coriander essential oils are high in antioxidants, vitamins A and C, and minerals like phosphorus, which help to prevent eye aging, macular degeneration, and stress. Coriander contains antibacterial and disinfecting qualities that protect the eyes from infectious illnesses like conjunctivitis.

M. Skin conditions

Coriander's disinfecting, detoxifying, antiseptic, antifungal, and antioxidant qualities make it excellent for treating eczema, dryness, and fungal infections. Coriander aids in the treatment of ulcers, inflammation, and spasms, as well as acting as an expectorant and protecting and soothing the liver.

IV. MEDICINAL BENEFIT OF FENNEL

The fennel plant, *Foeniculum vulgare* Mill. (Apiaceae family), is a popular annual and perennials plant with a fragrant odors. It was endemic to the Mediterranean area and Southern Europe. It is now extensively grown in temperate and tropical climates throughout the globe. In Asian nations, it is also a widely used medicinal or economic plants. The plant has a wide range of culinary and medicinal use. For homemade medicines, the bulbs, young branches, leaves, or fully matured or dried fruit are frequently utilized [10].

A. Antioxidant actions

Antioxidants found in nature are increasingly frequently employed to protect people from the harmful consequences of peroxidation. In nature, fennel was known to be a strong source of antioxidants, contributing to a healthy protective diet. The aerial sections of Italian population showed the highest DPPH scavenging action, and wild fennel had a higher phenolic and flavonoid concentration than medical and edible fennel. The volatile oil, unlike butyrate hydroxyanisole (BHA) or butylated hydroxytoluene, has strong antioxidant action (BHT).

B. Acaricidal activity

Dermatophagoides farinae and *Dermatophagoides pteronyssinus* were shown to have substantial acaricidal action in fennel oil. Fenchone is the most bioactive component. The chemical p-anisaldehyde was the most poisonous to *D. Farina*. Carvone has been identified as a bioactive component in the *Tyrophagus putrescentiae*, a possible home dust mite.

C. Insecticidal activity

Insecticidal effects of fennel extracts have been shown against a range of mites as well as insects. Trans-anethole has previously been shown to have effective larvicidal properties against mosquitoes. Fennel preparations were toxic to *Culex pipiens* larvae, while terpineol and 1,8-cineole are by far the most potent elements against *Anopheles dirus* but also *Aedes aegypti*, indicating that fennel may be utilised as an insecticide alternative.

D. Antimicrobial, antibacterial, and antifungal activity

Antibacterial qualities of plant oils and extracts have long been recognised, and they have a broad variety of applications, including raw and processed food preservation, medications, alternative medicine, and natural remedies. The chloroform soluble fraction of fennel stems has a powerful antibacterial and antifungal activity. Dillapional, scopoletin, imperatorin, psolaren, dillapiol, bergapten, & dillapional were revealed to be antimicrobial principles against *Bacillus subtilis*, *Cladosporium cladosporioides* or *Aspergillus niger*.

V. DISCUSSION

The current review is an effective way to present a consolidated report on the actual situation of research

related possible health benefits of three major seed spices, Cumin (*Cuminum cyminum* L.), Coriander (*Coriandrum sativum* L.), and Fennel (*Foeniculum vulgare* Mill.), and their major chemical composition and medicinal uses are shown in Table 1. Chemical composition of cumin is cuminaldehyde, γ -Terpinene, β -Pinene and its medicinal uses are Gastrointestinal, Reproductive, Nervous and Immune System. Antimicrobial, antioxidant, or activity are all terms that may be used to describe a substance. Coriander contains linalool, geraniol, carvone, limonene, camphor, borneol, or elemol, which have digestive, diuretic, tonic, carminative, stimulant, refrigerant, stomachic, aphrodisiac, anti-inflammatory, analgesic, insulin-like, antioxidant, and anti-spergillus properties. Aromatherapy, anticancer, antioxidant, hepatoprotective, stomachic, carminative, emmenagogue, stimulant, refrigerant, heart stimulant, antiemetic, anthelmintic, aphrodisiac or antimicrobial are some of the benefits of fennel.

Table 1: Show the brief health potential uses of major seed spices.

Seed Spices	Major Phytochemicals	Medicinal Uses
Cumin	Cuminaldehyde, γ -Terpinene, β -Pinene	Gastrointestinal, Reproductive, Nervous And Immune System. Antimicrobial, Antioxidant And Activity.
Coriander	Linalool, Carvone, Geraniol, Limonene, Borneol, Camphor, Elemol	Digestive, Carminative, Diuretic, Tonic, Stimulant, Stomachic, Refrigerant, Aphrodisiac, Analgesic, Anti-Inflammatory, Antioxidant, Insulin-Like And Anti-Spergillus Activity.
Fennel	Anethole, Fenchone, Phenols	Aromatherapy, Antioxidant, Hepatoprotective, Anticancer, Stimulant, Carminative, Stomachic, Emmenagogue, Refrigerant, Cardiac Stimulant, Antiemetic, Aphrodisiac, Anthelmintic, Antimicrobial

VI. CONCLUSION

Cumin has many health advantages, including anti-diabetic, antibacterial, antiseptic, and antioxidant properties, as well as prevention of blood platelet aggregation. Cumin's flavonoids apigenin and luteolin, as well as their glycosides, are thought to be responsible for many of the plant's biological functions. The antibacterial and anti-mutagenic effects of volatile oil are due to cuminaldehyde, a significant component. Cumin wasted residue has the potential to be a unique source of nutritious fibre that may be employed in a wide range of culinary applications. Coriander volatile oil is high in advantageous

phytonutrients, or the seeds are said to be good to one's health. It's been used as an fungicidal, antispasmodic, stimulant, cytotoxic, carminative, lipolytic, or stomachic chemicals. Coriander contains a number of health benefits, including hypoglycemic, hypolipidemic, antibacterial, insecticidal, antimutagenic, or aflatoxin-controlling characteristics. Coriander also offers a lengthy range of traditional health benefits. The therapeutic properties of coriander might well be correlated with high phytonutrient content. Coriander biomolecules have a bright future in the health-care industry because of these benefits. Fennel has a long history of use in Central Europe, the Mediterranean region, and China as a food and medicine. It's also a delicious and healthy supper. Trans-anethole, estragole, fenchone, sesquiterpenoids, coumarins, and polyphenolics were among the compounds produced by this plant, the bulk of which exhibited significant bioactivities. Fennel may be useful for the treatment of microbial infections, along with colic pain. Both the fruits so the whole plants of such a plants may be used as a resource of chemical or biological elements in the future. For future usage of this plants, systematic phytochemical but also biological mechanic study is necessary.

REFERENCES

- [1] Kumaravel S, Alagusundaram K. Antimicrobial activity and Phytochemical analysis of selected Indian spices. *J Pure Appl Microbiol.* 2014;
- [2] Kumaravel S, Alagusundaram K. Determination of mineral content in Indian spices by ICP-OES. *Orient J Chem.* 2014;
- [3] Martins IJ. Indian spices and Insulin Therapy in Diabetes and Neurodegenerative diseases. *J Diabetes Clin Stud.* 2018;
- [4] You W, Yu D, Xie D, Han C, Liu C. The invasive plant *Alternanthera philoxeroides* benefits from clonal integration in response to defoliation. *Flora Morphol Distrib Funct Ecol Plants.* 2014;
- [5] Wang Z, Cheng Y, An T, Gao H, Wang K, Zhou Q, et al. Detection of EGFR mutations in plasma circulating tumour DNA as a selection criterion for first-line gefitinib treatment in patients with advanced lung adenocarcinoma (BENEFIT): a phase 2, single-arm, multicentre clinical trial. *Lancet Respir Med.* 2018;
- [6] Singletary K. Coriander: Overview of potential health benefits. *Nutrition Today.* 2016.
- [7] Rajeshwari U, Andallu B. Medicinal benefits of coriander (*Coriandrum Sativum* L) Kışnişin (*Coriandrum Sativum* L) Tıbbi Faydaları. *Spat DD.* 2011;
- [8] S. B, P. K, M. K, H. KS. Coriander (*Coriandrum sativum* L.): Processing, nutritional and functional aspects. *African J Plant Sci.* 2014;
- [9] Acimovic M, Oljaca S, Jacimovic G, Drazic S, Tasic S. Benefits of environmental conditions for growing coriander in Banat Region, Serbia. *Nat Prod Commun.* 2011;
- [10] Dalzon B, Aude-Garcia C, Collin-Faure V, Diemer H, Béal D, Dussert F, et al. highlights macrophage-specific responses to amorphous silica nanoparticles. *Nanoscale.* 2017;