



Medicinal Importance of *Nigella sativa* Linn [black seeds]

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Abstract

Nigella sativa Linn a miraculous herb generally called as black cumin or black seeds all-round the world, which belongs to family of Ranunculaceae. Black seeds are also known as “the seeds of blessings” due its medicinal importance. There are numerous scientific researches on medicinal importance of *N.stiva*, and from these researches the pharmacological activities of black cumin have been proven. The most vital and main constituent of *N.stiva* is Thymoquinone, which has many important medicinal properties due to this, it is widely used for the treatment of various ailments including diabetes type 1 and type 2, rheumatoid arthritis, high blood pressure, strengthens the immune system, antioxidant, anti-tumor, anti-mutagenic, Antibacterial, antifungal, antihistaminic, cardioprotective, epilepsy, antiviral, hepatoprotective and many more. The objective of the appraisal is to recapitulate some significant medicinal properties of *Nigella sativa*.

Key words: *Nigella sativa* Linn; Thymoquinone; Antibacterial; Anticancer; Cardioprotective; Antioxidant

Introduction

The practice of herbal drugs, one of the chief healing methods of balancing and alternate medication is used yards of ages back in the East. In developing nations, huge segment of inhabitants (around eighty%) practices natural remedies aimed at healing diverse elementary therapeutic complications (Grover & Yadav, 2004). They are extensively used throughout the world due to its nontoxicity effects and easily availability in markets at affordable prices. Among several medicinal plants, *Nigella sativa* is evolving by way of a wonder herbaceous plant that having antique and pious contextual importance from way back, numerous investigations exposed the extensive range about medicinal possibilities. Along with its pharmacological importance, *N.sativa* may also utilized every bit as piquance and food preservative from ancient time. *N. sativa* or black cumin is a trivial shrub and yearly blossoming shrub which have its place in the family Ranunculaceae that having snowy, yellowish, rosy and purple subtle flowers holding five to ten

petals (Al-Khalaf & Ramadan, 2013). *N. sativa* may also known by different names in different regions and in different dialects of the world. For instance, according to Arab it is called as “Hubba Sawda” [black seed] or “Haibat el Baraka” (Kernels of benediction). And in Urdu, it is named as “Kalonji,” whereas in China, *N. sativa* is recognized as “Hak Jung Chou” (Aggarwal et al., 2008). Seeds of black cumin is a communal medicine utilized by the Islamic fortuneteller’s medication, subsequently seer Muhammad (PBUH) specified that black seeds are the therapy for all that ailments apart from decease (Sahih Bukhari 7:591) (Bukhari, Zaibag, Al-Hinai, Al-Moslih, & Sahih, 1976). *Nigella sativa* is generally recognized as black seeds. Black cumin is indigene to Southern Europe, Southwest Asia, North Africa and it is cultured in several nations globally. Like Mediterranean areas, Saudi Arabia, South Europe and some Asian nations. Black seeds and its oil is traditionally used from ancient time to treat various ailments. In traditional medications seeds are utilized to cure lung related disorders, like asthma, looseness of bowels, indigestion, febrility, flatulency, hemorrhoid, some complaints associated to cardiovascular diseases, body defense system, liver, breathing system and kidney disorders. Black seed also ropes absorption, help to fortify ingestion, and decline insulin in blood. Seeds are also utilize to oust harmful living bodies like worms from duodenal pathway. Seeds are beneficial for calming inflammation of lungs. It arouses menses, rises the production of breastmilk, delivers rapid vim, composes the CNS, boosts growth of hair and stops hair fall, averts skin rumpling etc. *N. sativa* extract stops tumor action. Researches reported that *N. sativa* and its extract have potential for cancer in animal studies. *Nigella sativa* and its active compounds especially thymoquinone is beneficial for numerous provocative sicknesses like cirrhosis, skin melanoma, cancer of pancreas, breast malignancy, and brain tumor (Thomas, 2014).

Active compounds of black cumin

Black cumin phytochemistry is miscellaneous which includes variety of diverse constituents like sugars, protein, fatty acids, essential fibers, vitamin contents, some vital minerals, saponins, alkaloids and various bioactive composites (Nergiz & Ötleş, 1993). The chemical constituents of black cumin seeds are bitter in taste, and their composition fluctuates contingent on the harvesting seasons as well as nature of specie, and depend on the ecosystem which include the weather and area in which it is cultivated (Bulca, 2014). A research reported that strangely, *N. sativa* comprises more than hundred therapeutic compounds, that toil collectively and producing synergistic upshot. Only 69 of them are considered and recognized (Hussain & Hussain, 2016). The utmost vital active chemical constituents of *nigella sativa* are thymoquinone, thymohydroquinone, dithymoquinone, p-cymene, carvacrol, 4-terpineol, tanethol, sesquiterpene longifolene, α -pinene and thymol etc. *N. sativa* seeds comprise two dissimilar kinds of alkaloid including, pyrazol alkaloids or indazole ring that having alkaloids which comprise nigellidine and nigellicine, as well as isoquinoline alkaloids like nigellicimine and nigellicimine- N-oxide. Furthermore, black cumin also comprise a potentially active anti-cancer compound like alpha-hederin, which is a water solvable pentacyclic triterpene and saponin. The magazine Food Chemistry reported that black cumin seeds contain high amount of vital proteins and amino acids. Black seeds encompasses fifteen different types of amino acids out of which 9 are essentially important, carbohydrates, some vital fatty acids like oleic, linolenic, linoleic acids, niacin, vitamin (A, B1, B2 and C) along with some essential minerals. Three active constituents in *N. sativa* oil yield a marvelous advantage due to which scientists were astonished to determine. After investigation they found, thymohydroquinone, thymol, and thymoquinone.

Pharmacological activities

Due to the presence of pharmacologically active compounds in black cumin it is extensively used as a drug to treat various ailments, in which cancer related ailments are on the top of list. *N.sativa* is also beneficial for the treatment of various diseases which include heart diseases, diseases related to respiratory system. Its active compounds show potential towards many ailments usually black seeds and its volatile oil is used as hepatoprotective, gastroprotective, antidiabetic, immunomodulator, antibacterial, antifungal, antiviral, renal protective and antioxidant properties. Scientist Wagner described two supreme oils (volatile) in *N.sativa* seeds is thymoquinone and nigellone. Nigellone act as antispasmodic and having Broncho dilating properties that subsidize *N.sativa* strength in contradiction of respiratory illnesses and as well as an anti histamine agent that aids in decreasing harmful indications of allergies. Thymoquinone comprises outstanding analgesic and anti inflammatory properties. Along with this, it also act as robust anti-oxidant that aids in purify poisons from body. The oil of black cumin is advantageous due to presence of over hundred of active constituents for example some elements, enzymes and vitamins and aromatic oils. It encompasses fifty-eight% of vital fats (fatty acids) such as omega 3 and omega 6. which are obligatory for making of prostaglandin E1 that help in balancing and fortifying body's defense system which provide energy to avoid contagions as well as allergies and regulate enduring sicknesses (Hussain & Hussain, 2016).

Antibacterial activities

Diverse rudimentary extract (oils) of black cumin revealed anti microbial effectiveness in contradiction of diverse microbial (bacterial) strain that are gram positive or gram negative bacteria's. The extract of black seeds displayed a possible result in contradiction of nearly all of the tested bacteria. The greatest effectual extract of black cumin are the alkaloids and aqueous excerpts. A research was conducted and it disclosed an improvement of anti bacterial bustle by using the excerpts in amalgamation by anti biotics like gentamisin and streptomysin (Hussain & Hussain, 2016). The study inveterate the sturdy antibacterial as well as antimycotic effect. It was also effectual for dropping insulin level in blood, this is vital to treat diabetic complications. Researchers of southern Asia exposed a numerous bacterial strain of the Methicillin-resistant *Staphylococcus aureus* showed sensitiveness towards *N.sativa*. Another study was conducted on anti bacterial bustle of black seeds contrary to *H. pylori* in individuals having non ulcer indigestion is dictated. *N. sativa* showed medically valuable anti-helicobacter *Pylori* action (Hannan, Saleem, Chaudhary, Barkaat, & Arshad, 2008).

Antiviral activities

Nigella sativa is also used as antiviral drug in today's modern world. Due to presence of thymoquinone, black seeds have potential to cope up with viral ailments. The effectiveness of *N.sativa* seeds and their active constituents depend on the target organism. Hepatitis C is a viral sepsis (infection) that is infrequently related to lethal illness, with 15–45% of diseased individuals improving within 6 months without any medication (WHO, 2015). However, chronic infection grows in the residual 55-85% out of which 15-30% ultimately progress to liver cirrhosis after several eons of tenacious virus carriage. Tenacious HCV infection has been a chief hazard aspect for hepatocellular carcinoma (HCC) growth in patients with cirrhosis (Sangiovanni et al., 2004). Black cumin is also beneficial against HIV virus, a study was conducted on HIV patient in which the infected individuals are exposed by black seeds for 6 months, afterward there was not any noticeable infection nor anti bodies contrary to virus in blood.

Antidiabetic activities

“Diabetes” is a polygenic ailment characterized by peculiarly high sugar levels in blood; any of numerous metabolic complaints noticed by unnecessary urination and tenacious dehydration. It also leads several severe problems mostly sicknesses related to kidney failures and heart issues (Sowers & Epstein, 1995). Diabetes is due to either pancreas, in which it fail to make sufficient insulin which is known as type 1 diabetes and the cell failure to retort properly towards the insulin that is formed in body, this is known as type 2 diabetes. It is reported that oxidative stress (OS) show a significant role in development of diabetic complications because OS leads to declining the efficacy of insulin producing cells or pancreatic beta cells (PBCs) that sequentially alters the insulin producing processes in the body. Black cumin and its active compounds have potential contrary to diabetic complications, because it decline OS that ultimately aids to conserve the insulin producing cells (PBCs) cubicle. Black cumin seeds are traditionally used for the treatment of diabetes. Number of researches inveterate the potential of *N.sativa* seeds and its extract that help to maintain glucose level by stimulating pancreatic functions. When a diabetic patients used up 2 g of seeds for 3 months each day, which results in deductions of glucose levels and improved the function of insulin producing cells (PBCs),it was suggested that *N.sativa* seeds are helpful to treat type 2 diabetes (Hammad Shafiq, Masud, & Kaleem, 2014).

Antioxidant activities

The major bioactive compound thymoquinone from black cumin is also known for its potential as an anti-oxidant agent. Thymoquinone could function as a superoxide radical and free radical forager. Additionally, thymoquinone also conserves bustle of several anti-oxidant enzymes like, glutathione-S-transferase, catalase and glutathione peroxidase [Woo et al., 2012]. *N. sativa* and its vital compound thymoquinone defend mucous membrane layer of stomach from gastric mucous membrane injuries. Dithymoquinone and thymoquinone are chief anti-oxidant compounds in black cumin. The black cumin seeds develops anti-oxidant defense ability in the body, by consuming it in any manifestation. Research studies show that black seeds declines lipid peroxidation and rises antioxidant enzymes.

Anticancer activities

Tumor (cancer) is speedily rising wellness issue which causing stern issues to medical specialists and scientist. Cancer is a major cause of deceases globally. Black seed oil is the utmost influential grease on the earth. Thousands of studies are conducted on potential of seeds especially which are related to well-being of humans and chiefly for the treatment of cancer and its preclusion. The most vital compound thymoquinone, is considered as a mostly operative for dropping magnitude of surviving cancer cells or tumor. *N.sativa* offers hefty profits for numerous provocative cancer’s like mammary cancer, cancer of prostate, gastric cancer liver, melanoma, skin cancer, intestinal cancer. In actual fact, the active compounds, thymoquinone and thymohydroquinone lead to decline in tumor by 52%. The food supplemented with back seeds and honey revealed that there is a defensive potential contrary to intestinal cancer, lung cancer and melanoma. In women’s the utmost communal cancer is the cancer of breast which triggered millions of deceases in worldwide. A study was conducted on potential of black cumin against mammary tumors, which disclosed the potential of black seeds in deactivation of mammary tumors or cells (Farah & Begum, 2003).

Cardiovascular activities

Cardiovascular diseases (CVD) are the foremost reason of death, nearly accounting for 17.7 million deceases worldwide, which is nearly 30% of worldwide deaths. Among these, 32% females whereas 27% of males deceased due to CVD in 2004. CVDs are the chief reasons for deceases worldwide and it causes 47% of all deceases in Europe. The causes of cardiovascular ailments are varied. Atherosclerosis, low density lipoproteins, hypertension and high cholesterol are the chief reasons for heart diseases. A study was conducted in which researchers described the presence of alpha-linolenic acid and linolenic acid (omega 6 and 3) and plant sterols in black seeds, aid strengthen and rise the pliability of blood vessels, reduce capillary brittleness and porousness, averts coagulum development, and decline blood pressure. Moreover, *N. sativa* is also helpful for the treatment of cardiac arrest, brachycardia, low blood pressure and high blood pressure. An extract from *N. sativa* has been revealed to have cardioprotective potentials, reducing damages and diseases related cardiovascular system by enhancing healthiness of heart. Researches reveled the consumption of *N. sativa* seeds help in dropping of high BP and heartrate. The active compound thymoquinone also help to cure abnormalities related to endothelial layers that also leads to several heart diseases. Those individuals with heart diseases especially aged ones, thymoquinone provides assistances in improving the faction of endothelium (Hammad Shafiq et al., 2014).

Culinary uses

Black cummin is utilized from centuries in food for piquancy. It is also added to different food dishes to enhance its flavor. Black cummin is widely utilize to enhance flavor especially in bakery products and cheese because it has very low level of harmfulness.

Adverse effects

Nigella sativa and their seeds are harmless and it is an effectual medicinal plant which can be utilized by virtually everyone. Overall, *N. sativa* seeds and its oil is harmless and they don't cause any stern adverse result. Once an accurate dosage is properly consumed than there are no any exasperations nor any adverse reactions are caused. The toxicological possessions of thymoquinone are evaluated in vivo and in vitro, by means of exposing the samples by thymoquinone (Hussain & Hussain, 2016).

Conclusion

Nigella sativa is known as “a seed of blessing” due to its medicinal potency towards number of different aliments, especially it provide protection against the top two aliments (cancer and cardiovascular diseases) which leads to worldwide deaths. Along with its medicinal uses *N. sativa* is also utilize in food for piquancy and to enhance flavor. The purpose of the appraisal is to recapitulate some significant medicinal properties of *Nigella sativa* its active compounds against numerous ailments.

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