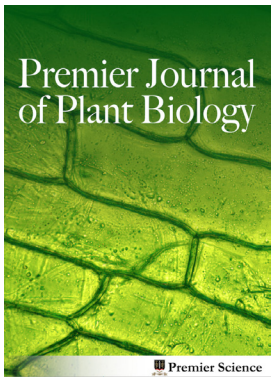

Therapeutic Properties of *Nigella sativa* (Black Cumin Seeds): A Review

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ABSTRACT

Plants are enriching with many bioactive and nutritional products that are useful for balancing nutrition levels in humans. Many food items have beneficial effects for mankind. From many hundreds of years, herbs are involved in therapeutic activities. Few of food stuff efficiently involve in human's use such as dates, figs, black cumin seeds (*Nigella sativa*), olive oil, grapes and other cumin seeds. *N. sativa* has much importance in diseases curing. *Nigella sativa* has contained carbohydrates, fats proteins and crude fibre and also have limonene citronelloland carvonein little amounts. *Nigella sativa* seeds also compose on α-hederin. As cumin seeds have widely used in food stuff for better aroma and traditionally used as medicines against various diseases such as severe dyspepsia, diarrhoea, acute gastritis, cancer and a diabetes. It belongs to the powerful healing family. *N. sativa* involved in indigestion as stimulator. It stimulates various digestive enzymes which examined in animals (rat pancreas and intestinal mucosa). The Nigella dietary cumin has increased efficiently stimulatory effect on bile flow up to 25%. It increases bile secretions of bile acid in gastrointestinal track. *N. sativa* has an efficient effect in a diabetic patient. As it lowers the sugar level in diabetic patients and moderate its level. Few years ago, it had been reported that black seeds have an antidiabetic effect in diabetic humans. *N. sativa* has identified as an anti-inflammatory and analgesic effects by reducing NF-kB. Oil of *N. sativa* consists of 37.3% p-cymene and 13.7% TQ involve in palliative or inflammatory effect. *N. sativa* has been broadly studied in vitro and in vivo models differentially about its anti cancer property. *N. sativa* has an antioxidant and cytotoxic ability with also many other beneficial properties like pro-apoptotic, anti-mutagenic, anti-metastatic and antiproliferative effects in various types of most important cancer cells and lines of cancer cell. In present studies, few therapeutic properties have discussed.

Keywords: *Nigella sativa*, Therapeutic properties, Anti-inflammatory, Antidiabetic, Anticancer

Introduction

Many food items have beneficial effects for mankind. From many hundreds of years, herbs are involved in therapeutic activities. Plants are enriching with many bioactive and nutritional products that are useful for balancing nutritional level in humans. Few of food stuff efficiently involve in human's use such as dates, figs, black cumin seeds (*Nigella sativa*), olives oil, grapes and other cumin seeds. *Nigella sativa* is black seed and is also known as black cumin. It is native of Southwest Asia, North Africa and Southern Europe. From family Ranunculaceae, *Nigella sativa* is an annually growing plant. It is cultivated in Pakistan, India, Iran, Turkey, Syria and Saudi Arabia. In the past, black cumin seeds and its oil had extensively used as in food, medicine or therapeutic treatments by Arabian and Indian civilization.[1] *Nigella sativa* has dry, roasted seeds used in food items like bread and prickles, widely used in Pakistan and India.[2]

Methodology

A transparent and systematic literature search was conducted to identify relevant articles. PubMed, Scopus, Web of Science and Google Scholar data bases were searched. A combination of Medical Subject Headings (MeSH) and free-text terms was used. The key terms included: "Diabetes", "nanotechnology", "treatment", "management", "intervention", "outcome" or "efficacy".

Date Range

Articles published between July 1, 2000, and Jun 30, 2025, were included. This range was selected to ensure the inclusion of the recent, relevant, and evidence-based research while avoiding out-dated practices.

Chemical Components

Nigella sativa seeds contain 28.5%fat, 8.4% crude fibre, protein [26.7%], carbohydrates [24.9%] and 4.8% total ash. *N. sativa* seeds also consist of various minerals like Zn, P, Cu and Fe and vitamins. Moreover, many active compounds are identified and under consideration in *N. sativa*. Thymoquinone (TQ) is the most important compound of black Nigella seeds, contains (30%–48%) in it. Thymol, α-pinene, thymohydroquinone, 4-terpineol [2%–7%], nigellone, carvacrol [6%–12%], p-cymene [7%–15%], 1%–4% t-anethole and1%–8 sesquiterpene longifolene.[4,5] *Nigella sativa* have few others vital compounds such as "limonene, citronellol, carvone in trace amounts, and two types of alkaloids (isoquinoline alkaloids) and (pyrazole alkaloids)". *N. sativa* seeds also consist of α-hederin.[6,7] *N. sativa* also have rich fatty acid oils mostly in unsaturated form, consisting lino-leic acid 50% to 60%, dihomolinoleic acid 10%, oleic acid 20% and eicosadienoic acid 3%.[8,9]

Therapeutic Effects of Black Cumin Seeeds

The black seeds used for treatment of asthma, rheumatism, bronchitis and other inflammatory diseases in Middle East countries. It is also used in a gastrointestinal, emmenagogue, and anti-diarrhoeal, to control bloodsucking infections, liver tonic and improve immunity.[3] Many years ago, black seeds used as therapeutic medicines in an Indian traditional system like Unani and Ayurveda. The Middle East and Southeast

Asian countries found efficient therapeutic potential in black cumin seeds or *Nigella sativa* like antihypertensive, diuretic, anti-diabetic, immune-modulatory, anticancer, spasmolytic, analgesic, hepatoprotective, and broncho-dilator, gastro-intestinal protective and renal-protective properties (Figure 1)

As cumin seeds have widely used in food stuff for better aroma and traditionally used as medicines against many diseases such as severe dyspepsia, diarrhoea, acute gastritis, cancer and diabetes. It belongs to the powerful healing family. In this present study, few therapeutic properties are discussed.

Digestion Stimulator

N. sativa involved indigestion as stimulator. It stimulates various digestive enzymes which examined in animals (rat pancreas and intestinal mucosa) trypsin at the same time.[10,11] In animals, small intestinal maltase enhanced when black seeds present in an animal fed while sucrose and lactase has no effect.[10] The Nigella dietary cumin has increased efficiently triggering effect on bile fluid pressure up to 25%. It increases bile secretions of bile acid in digestive track. Bile juice takes a significant role in digestion and absorption. In experimental rat, cumin seeds have also effect on food residence in gastrointestinal tract.[12]

Effect as Antidiabetic

N. sativa has an efficient effect in diabetic patient. As it lowers the sugar level in a diabetic patients and moderate its level. Few years ago, it had been reported that black seeds have an antidiabetic effect in diabetic humans. In experimental study, almost 75–80 non-insulin dependent diabetes mellitus were orally given black cumin seeds for six months and examined after every thirty- six days interval significantly lessen in all patients. Dietary cumin seeds show efficient effect on the metabolic abnormalities in a diabetic patient (model animal rat).[13] Black cumin seeds have beneficial effects by reducing hypoglycaemia and glucosuria. The black seeds oil are efficiently reduce blood sugar level in diabetic rats.[14] *N. sativa* increases the insulin level in serum of STZ/NA- diabetic hamster.[15] Black cumin seed oil shows effective results to lowering blood glucose level in diabetic within two days by reducing glycosylated haemoglobin rapidly.[16] In recent study, it has found that *N. sativa* has an ability to affect insulin resistant syndrome by various biochemical parameters.[17] In STZ diabetic rats, black cumin seed oil significantly down-regulated the appearance of apoptosis activity in vascular muscles or tissues.[18]

Affect as an Analgesic

N. sativa has identified as anti-inflammatory and analgesic effects by reducing NF-kB. Development of tumor cells also occurs due to the inflammation. Oil of *N. sativa* consists of 37.3% p-cymene and 13.7% TQ involve in palliative or inflammatory effect. Intraperitoneal injection efficiently effect inhibited carrageenan-induced paw oedema. Opioid receptors involved in analgesic or inflammatory effect. In microglial cells, the anti-inflammatory stimulation effect have identified showed by TQ.[19] In human trails, *Nigella sativa* has anti-osteoporotic effect by down-regulation cytokines inflammation and transcription factor as NF-kB.[20]

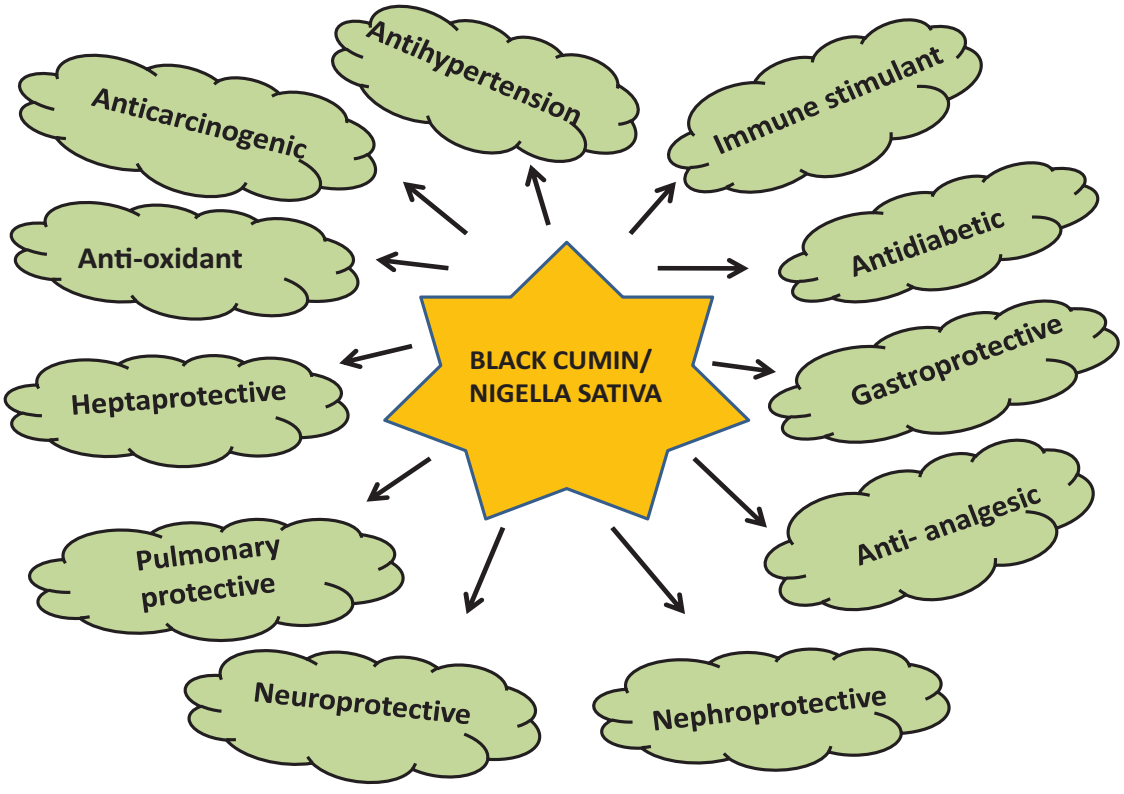

Fig 1 | Various therapeutic property of *N. sativa* (Black cumin seeds)

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N. sativa oil treatment has an efficiently reduced antibody production against typhoid vaccination in long Evan rats. Black cumin seeds efficiently up-regulated white blood cells production and increased spleen weight and improved splenocyte proliferation in mice primary cells.[21] *Nigella sativa* has another significant property as it acts as a radioprotective against gamma rays in rats.[22]

Effect as Anticancer

N. sativa has been broadly studied in in-vitro and in-vivo models differentially about its anticancer property. *Nigella sativa* has an antioxidant and cytotoxic ability with also many other beneficial properties like "anti-mutagenic, pro-apoptotic, anti-metastatic and antiproliferative" effects in various types of most important cancer cells and lines of cancer cell.[23] Black cumin seeds show efficient effect on stomach ulcer prevention that is induce by necrotizing agents and also prevent from the rigorousness of gastric ulcer in Shay rats.[24] *N. sativa* oil shows an efficient effect, 123 about reducing malignant and benign colon cancer and tumor size, multiple and incidences. It is also show antioxidant and anti-secretary properties against cancer in Wister rat infected by colon cancer.[25] Recent studies demonstrated that almost ten or more than ten types of cancer cells suppressed by thymoquinone which is present in black cumin seed in rich condition. Such as colorectal cancer, leukaemia, breast adenocarcinoma, osteosarcoma, ovarian cancer, myeloblastic leukaemia, pancreatic cancer, etc. *N. sativa* down-regulates the concentration of methotrexane hepatotoxicity. This kind of study has observed mostly in children infected by acute lymphoblastic leukaemia.[26,27] During the study of black cumin seeds, it was investigate that thymoquinone suppressed the MUC4 expression, more apoptosis and less motility and also reduce transferring of pancreatic cancer cells.[28]

Skin Pigmentation Disorders

Hyper-pigmentation activity is demonstrating very interesting parameters of *N. sativa*. As it has an active TQ ingredient which has the tendency of treating with skin disorders as a novel melanogen (skin pigmentation factor). In black skin cells, cholinergic receptor cells are stimulated by thymoquinone in the wall lizard.[29]

Conclusion

N. sativa has many therapeutic properties as it can use easily in adequate quantity. People must use it in their diet. It balancing and moderating all metabolic functions in a correct way. Its adequate amount in daily diet can fulfil the requirement of any mineral in a body. By using these black seeds, treatment for such horrible diseases can be found like cancer and diabetes. *N. sativa* has large components of TQ which play therapeutic roles as anti-inflammatory, analgesic, heptoprotective, nephroprotective, neuroprotective. All this study reveals that black seeds should involve in drugs and in adjuvants. Seeds of *N. sativa* or oil of *Nigella sativa* contains TQ which could be use as suitable combinations with other therapeutic agents. Further studies are suggested to explore more precise cellular and molecular targets for therapeutic means.

Future Prespective

It is advised to use black seeds regularly, because it is a cure for every disease except death**.** So *Nigella sativa* has not had few therapeutic properties for few diseases. It has therapeutic property for many other diseases which are unknown and still have not any proper or an adequate treatment.

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