Pharmaceutical Significance of *Nigella Sativa* L., a Wonder Herb

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**Abstract**

*Nigella sativa* L. (Family: Ranunculaceae; commonly known as black cumin) is an annual herb. *N. sativa* is cultivated and distributed all over India, especially in Punjab, Himachal Pradesh, Gangetic plains, Bihar, Bengal, Assam and Maharashtra. Among the traditional remedies, prescriptions of *Nigella sativa* for the treatment of various diseases are well-known since the prehistoric era. Therapeutic effects of *Nigella sativa* are thought to be due to nigellone and thymoquinone contents. The reported pharmacological properties include protection against disease and chemical-induced renal and hepatic toxicity, anti-inflammatory, analgesic, antipyretic, antimicrobial and antineoplastic activities. The oil decreases blood pressure, cholesterol, triglycerides, and glucose and increases respiration, hemoglobin and packed cell volume. In the traditional system of medicine, black cumin seeds are effective against cough, bronchitis, asthma, chronic headache, migraine, dizziness, chest congestion, dysmenorrheal, obesity, diabetes, paralysis, hemiplegia, back pain, infection, inflammation, rheumatism, hypertension and gastrointestinal problems such as dyspepsia, flatulence, dysentery, and diarrhea. In this review, we will elaborate about this wonder herb having miraculous effects.

**Keywords:** Anti-diabetic activity, Anti-microbial activity, Black cumin, Phytochemicals, Thymoquinone.

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**Introduction**

Ever since ancient times, the drugs delivered from the plant kingdom are used to alleviate or to cure human diseases. The indigenous system of medicine is gradually gaining popularity mainly because of less or no toxic or side effect of herbal drugs. Simultaneously, researchers have developed a growing interest for traditional remedies used by ancient tribes and old civilizations. It is believed that investigation of such ancient drugs on scientific line with modern scientific appliances and methodologies may unravel a vast number of effective remedies for treating diseases and alleviating human sufferings. The inventory of medicinal plants, their availability and uses started as early as 3,500 BC or even prior to that in Indian, Egyptian and Chinese civilization. It is estimated that about 2,50,000 to 5,00,000 plant species present on earth possess medicinal properties and are used to curate a number of disorders. In most of Asia, traditional medicinal plants are part of a culture and it is passed through the generations and hence promoting the use of the medicinal plant for health purposes.

*Nigella sativa* L. (Family: Ranunculaceae; commonly known as black cumin) is an annual herb possessing a wide range of medicinal uses notwithstanding its commercial significance as a spice-yielding plant.

**Nigella Sativa**

**Scientific Blassification**

*Kingdom:* Plantae.

*Division:* Angiosperms.

*Class:* Eudicots.

*Order:* Ranunculales.

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seed well, as the Egyptians used to keep the black seeds with mummies in their tombs, thinking that it would help them in the life thereafter. This indicates that *Nigella sativa* was used by Egyptians in different walks of their lives. The Holy Prophet Muhammad (PBUH) appreciated the use of black seed to remedy every illness except the death (Figures 1 and 2). [11]

**Morphological Features of Nigella sativa**

*Nigella sativa* is a pretty erect herb, 30-60 cm high. Its leaves are alternate and bipinnately dissected. The stipules are small. The flowers are terminal, pedunculated and whitish blue or purplish in color. Sepals are five, regular, deciduous, imbricate, and petaloid. Petals are five with long claws and small bifid limbs. Stamens are numerous. Carpals are 3-10, sessile, connate below and, each with several horizontal ovules. Two seriates on the suture and style is usually long. The fruit is a capsule, dehiscing along ventral suture of a free portion of individual carpel. Dried fruit and seeds are the main plant components and are mostly used medically. Seeds of *Nigella sativa* are black in color and triangular in shape. The seed is about one-eighth inch long having a rough interior and a white oily kernel. On rubbing, the seed diffuses a pleasant odor of lemon with a slight soupcon of carrot. [12]

**Geographical Distribution of Nigella sativa**

*N. sativa* is cultivated and distributed all over India, especially in Punjab, Himachal Pradesh, Gangetic plains, Bihar, Bengal, Assam, and Maharashtra. [5] Apart from India, the species is also grown in Syria, Lebanon, Israel and South Europe, and Bangladesh, Turkey, Middle-East and the Mediterranean basin. [13,14] The species grows well in cool-dry to warm-humid areas. Cool and humid weather favors flowering and seed set. The species is grown once in a year during rabi season in any good soil from October to November in plains and from April to the end of May in hills, and yield per acre is not satisfactory. [15] The yield of black cumin seeds has been reported to be 8.13 q/ha. [16] In the Indian market the seeds are sold at the rate of Rs 250-300/Kg. [5] It is reported that the species is highly suitable for cultivation by marginal farmers. Although a native place of *Nigella sativa* is not exactly known, this herbaceous plant belongs to countries around the Mediterranean Sea like Egypt, Turkey and Italy. [17] Roxburgh believes this plant to be a native of India so also called as *Nigella indica*. [18]

**Phytochemicals of Nigella sativa**

According to Ahmed Aftab *et al*, many active compounds have been isolated, identified and reported in different varieties of black seeds. The most important active compounds are thymohydroquinone, dithymoquinone, thymoquinone (30%-48%), 4-terpineol (2%-7%), sesquiterpene longifolene (1%-8%) α-pinene, t-anethol (1%-4%), p-cymene (7%-15%), carvacrol (6%-12%) and thymol etc. [19] Black seeds also contain some other compounds in traces. These contain two different types of alkaloids; isoquinoline alkaloids like nigellicimine-N-oxide and nigellicimine and indazole ring bearing alkaloids or pyrazol alkaloids like nigellicine and nigellidine. The seeds also contain alpha-hederin, a water-soluble pentacyclic triterpene and saponin, a potential anticancer agent. [19,20] Other compounds like carvone, limonene, and citronellol are also found in traces. Most of the pharmacological properties of *Nigella sativa* are mainly due to quinine constituents, out of which thymoquinone is the most important quinine constituent and main reason behind the medicinal properties of the seed. On storage, thymoquinone yields dithymoquinone and higher oligocondensation products. The seeds of *Nigella sativa* contain protein (26.7%), fat (28.5%), carbohydrates (24.9%), crude fibre (8.4%) and total ash (4.8%). Various vitamins and minerals like Cu, P, Zn and Fe also contents of *Nigella sativa* seed in good amount. The seeds contain carotene which is converted by the liver to vitamin A. Root and shoot are reported to contain vanillic acid. [21] Many previous studies reported that the *Nigella sativa* seeds to contain a fatty oil rich in unsaturated fatty acids, mainly linoleic acid, eicodadienoic acid, oleic acid, and dihomolinoleic acid. In *Nigella sativa* seed saturated fatty acids also present about 30% or less. α-sitosterol is a major...
sterol that accounts for around 55% of the total sterols of black seed and stigmastanol one of the major sterol after α-sitosterol. In some studies, it is reported that the other components includes nigellone, avenasterol-5-ene, avenasterol-7-ene, camp esterol, cholesterol, citrostradienedion-1, cyclohexenol, gramisterol, lophenol, obtusifoliol, stigmastanol, stigmastigerol-7-ene, β-amyrin, butyro-spermol, cycloartenol, 24-methylene cycloartenol, taraxerol, tircullol, volatile oil (0.5-1.6%), fatty oil (35.6-41.6%), oleic acid, esters of unsaturated fatty acids with C15 and higher terpenoids, esters of dehydrosteaol, hederagenin glycoside, aliphatic alcohol, linoleic acid, melanthin, melathigenin, β-unsaturated hydroxy ketone, tannin, resin, reducing sugar, glycosidal saponin and protein.

Nutritional Value of Nigella sativa

The earlier studies have shown Nigella sativa to have a high nutritional potential i.e., protein (22%), fat (38-40%) and carbohydrates (32%). The mineral and vitamin contents per kg seeds are iron (105 rag), copper (18 rag), zinc (60 mg), phosphorus (527 rag), calcium (1860 rag), thiamin (15.4 rag), niacin (57 mg), pyridoxine (5.0 rag) and folic acid (160 pg). A qualitative study of Nigella sativa and a number of other plant extracts of Saudi origin used in folk medicine has revealed the presence of sterols, triterpenes, tannins, flavonoids, cardiac glycosides, alkaloids, saponins, volatile oils, coumarins, volatile bases, glucosinolates and anthraquinones.

Pharmaceutical Significance of Phytochemicals of Nigella sativa

In traditional system of medicine, black cumin seeds are effective against cough, bronchitis, asthma, chronic headache, migraine, dizziness, chest congestion, dysmenorrhea, obesity, diabetes, paralysis, hemiplegia, back pain, infection, inflammation, rheumatism, hypertension and gastrointestinal problems such as dyspepsia, flatulence, dysentery, and diarrhoea. It has also been used as a stimulant, diuretic, emmenagogue, lactagogue, anthelmintic and carminative, and applied to abscesses, nasal ulcers, orchitis, eczema and swollen joints. Seed oil is considered to be local anesthetic. The species possesses anti-microbial activity. Diethyl ether, methanol, chlorophyll and total plant extracts as well as seed oil was found to inhibit Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli and a pathogenic yeast Candida albicans, anti-malarial, antioxidant (thymoquinone constituent of seed oil enhance the oxidative scavenging system, anti-inflammatory (the oil and thymoquinone); thymoquinone has the ability to attenuate allergic airway inflammation by inhibiting Th2 cytokines and eosinophil infiltration into the airways and exploratory effects, anti-cancerous methanolic extract of plant exhibits potent inhibition of cancerous cell growth against HL-60 and U-937 cell lines with IC50 value 13.50 μg/mL and 28.31 μg/mL respectively, antitumorogenic, anti-hypertensive, antiviral, anti-asthmatic (crude seed extracts exhibits spasmylytic and bronchodilator activities mediated possibly through calcium channel blockade), anti-allergic (oil is an important adjuvant for the treatment of allergic disease), anti-diabetic, anti-lipidemic, antiobesity, anticonvulsant, antitoxic, antihemorrhagic, antitumorigenic properties apart from having immunomodulatory (extract inhibit human neutrophil elastase activity which is mainly attributed to curcumin), hematological (oil play role in modulating the balance of fibrinolysis/thrombus formation by modulating the fibrinolytic potential of endothelial cells), gastroprotective (thymoquinone protect gastric mucosa against injurious effect of absolute alcohol and promote ulcer healing), naphroprotective, diuretic, cardiovascular (active ingredient thymol has shown to lower blood pressure through blockade of calcium channel(s)) properties. The species is protective against heavy metal, effects nitric acid production and also possesses analgesic activity. Moreover, essential oil was found to be effective against C(VI) hazard and may be a promising candidate against different environmental pollutants. Tasawar et al. (2011) reported that black cumin (tested on 80 subjects, divided randomly into 2 groups) is effective in changing the lipid profile significantly in a way that is beneficial to heart. N. sativa is also a potential source for antidermaphytic drugs. The ether extract of seeds and its active principle thymoquinone are found to be effective against many species of three important genera of dermatophytes: Trichophyton, Epidermophyton and Microsporum. The volatile oil inhibited the spontaneous movements of rat and guinea pig ureterine smooth muscle and also the contraction-induced oxytocin suggesting its antioxytocic potential. Hot water extract of N. sativa, as well as whole seeds in large oral doses, causes abortion in human pregnant females. Thymoquinone has been reported to exhibit effect on dopaminergic neurons against Parkinson’s disease. The species also possesses insecticidal activity. An essential oil from dried fruits was isolated by hydrodistillation and tested for its repellent, toxic and developmental inhibitory activities against wheat flour pest Tribolium castaneum. Seed cakes of N. sativa in the feed of buffalo and lambs improved their body weight and productivity as well as seeds in the food of broiler chicks improved their immunity and feed conversion. Some significant pharmaceutical properties of N. sativa are mentioned below:

Anti-microbial Action

Studies revealed that the oil of N. sativa has impressive antibacterial activity. The study showed the extract successfully eradicated a non-fatal subcutaneous staphylococcal infection in mice. The oil proved to be more effective against many bacteria strains, including those known to be highly resistant to drugs. The essential oil has been shown to have activity against Gram-positive and Gram-negative bacteria both. However, activity against Gram-positive bacteria such as Staphylococcus aureus and Vibrio cholerae was found to be stronger. Bacteria like Staphylococcus aureus, S. pyogenes...
and S. viridans are more susceptible to its oil. Anti-bacterial activity of N. sativa is said to be due to thymoquinone, which prevent bacterial biofilm formation and show anti-bacterial effect on pathogenic bacteria at low concentrations of 8-32 μg/mL.\[^{38}\] In vitro studies have also revealed its moderate antifungal activity on growth of pathogenic fungi.\[^{71,73}\] The in vivo studies also supported that the aqueous extract from N. sativa seeds exhibits inhibitory effect against fungal infections.\[^{74}\]

Khan et al., (2003) studied the effect of aqueous extract of N. sativa seeds on candidiasis in mice. An intravenous inoculum of Candida albicans formed colonies of the organism in the spleen, kidneys and liver. Treatment of mice with the plant extract (6.6 mL/kg equivalent to 5 mg of estimated protein, once daily for 3 days) 24 hours after the inoculation, started a considerable inhibitory effects on the development of the pathogen in all organs considered. A 5-fold decrease in Candida in kidneys, 8-fold in liver and 11-fold in spleen was observed in the group of animals post-treated with the plant extract. Histopathological examination of the respective organs confirmed these findings. These results indicate that the aqueous extract of N. sativa seeds shows inhibitory result against candidiasis and this study confirms the traditional use of N. sativa seeds in fungal infections.

**Hepatoprotective Action**

N. sativa is found to have a hepatoprotective effect. This is due to its active phytochemicals thymoquinone. According to Mohideen et al. (2003),\[^{75}\] it possesses significant hepatoprotective activity against carbon tetrachloride-induced toxicity on the liver of male Wistar rats. In another study on rabbit’s model, the effect of N. sativa against carbon tetrachloride-induced acute liver injury showed significant hepatoprotective activity.\[^{76}\] Phytochemical and biological investigation of N. sativa L. seed waste extracts has also found it to have a promising hepatoprotective effect.\[^{77}\]

N. sativa also attenuates the side effects associated with some common medications used by gastroenterologists. Cyclosporine, used by gastroenterologists for disorders such as recalcitrant Crohn’s disease, is often associated with nephrotoxic side effects, which N. sativa can limit due to its antioxidant properties.\[^{55}\] Similarly, N. sativa administration protects hepatic tissue from deleterious effects of toxic metals such as lead and reduces hepatic lipid peroxidation.\[^{78}\] Hepatoprotective effect of N. sativa oil on carbon tetrachloride-induced liver toxicity in adult wistar rats was studied by Danladi et al. (2013), which showed N. sativa decreased lipid peroxidation and liver enzymes and increased antioxidant defense system activity in the CCl4-treated rats.\[^{79}\] Turkdogan et al. (2003) observed that N. sativa has a significant hepatoprotective effect in CCl4-administered rabbits. It was also found that N. sativa can prevent liver fibrosis and cirrhosis, suggesting that N. sativa protects liver against fibrosis possibly through immunomodulatory and antioxidant activities.\[^{80}\]

**Anti-diabetic Action**

Many studies have been conducted to see hypoglycemic effect of N. sativa and thymoquinone. In a study Murli et al. (2011) showed positive results in streptozotocin (STZ) induced diabetic rats. Aqueous extract of N. sativa seeds causes gradual partial regeneration of pancreatic β-cells, rise in the serum insulin concentrations and reduction in the elevated serum glucose.\[^{81}\] In another study a plant mixture, which contained N. sativa, produced a strong hypoglycemic effect in STZ diabetic rats.\[^{82}\] The hypoglycemic effect of the plant causes a decrease in glucogenesis. Another group of researchers using extra plant mixture, which comprises N. sativa, stated the noteworthy glucose-lowering effect.\[^{83}\] Intragastric N. sativa oil administration to nicotinamide-induced diabetic hamster (400 mg/kg/day dose) showed a substantial decline in blood glucose and increase in insulin. Oral administration (500 mg/kg) of N. sativa oil to STZ diabetic rats reduced fasting blood glucose expressively, without any change in insulin level.\[^{84}\]

**Anti-inflammatory and Analgesic Action**

The N. sativa seed oil and its phytochemical thymoquinone have been found to have a potent anti-inflammatory effect.\[^{13}\] Another compound, nigellone, inhibits the histamine release from the mast cells at low concentration, supporting the plant’s anti-asthmatic role. Effects of its seed extract exhibited good anti-inflammatory and proapoptotic effects in pancreatic cancer cells.\[^{85}\]

In the study by Alemi et al., (2012)\[^{86}\] the aqueous extract of N. sativa was found to possess anti-inflammatory and analgesic activities in animal models. The anti-inflammatory effect of the alcoholic extracts of N. sativa seeds and its callus on mix glial cells of rat with regard to their thymoquinone content was investigated. Inflamed by lipopolysaccharide, the mixed glial cells were exposed to anti-inflammatory studies in the presence of multiple quantities of thymoquinone and the alcoholic extracts. Results confirmed that thymoquinone content of the callus of leaf was 12 times higher than that measured in the seeds extract. A real-time polymerase chain reaction analyzed the effect of thymoquinone (25-75 μM) on the expression of different pro-inflammatory cytokines and chemokines. Thymoquinone has been found to significantly reduce pancreatic ductal adenocarcinoma cell synthesis of monococyte chemoattractant protein-1, tumour necrosis factor-alpha, interleukin (IL)-1 β, and cyclooxygenase-2 in time and day dependent manner. At 24 hours, thymoquinone almost completely abolished the expression of these cytokines. Thymoquinone also increased p2IWAF1 and was found to have inhibited histone deacetylases activity, and induced histone hyperacetylation. Histone deacetylases inhibitors have been shown to ameliorate inflammation-associated cancer. Thymoquinone as a novel inhibitor of pro-inflammatory pathways delivers a hopeful approach that associate anti-inflammatory and proapoptotic modes of action.\[^{85}\] Thymoquinone exhibit a slight inhibitory effect...
on cyclooxygenase-1 expression and prostaglandins-E2 production in a mouse model of allergic airway inflammation. This finding suggests that thymoquinone has an anti-inflammatory effect during the allergic response in the lung, through the inhibition of prostaglandins-D2 synthesis and T helper cells-2 driven immune response.[87] The hexane fraction of N. sativa seeds’ methanol extract revealed substantial anti-inflammatory activity by inhibiting nitric oxide release in lipopolysaccharide-stimulated RAW 264.7 macrophages, with an IC50 value of 6.20 μg/mL (Pichette et al, 2012).[88–90] A clinical trial study was conducted as prospective and double blind with descriptive analytic to investigate the anti-inflammatory property of N. sativa in patients with symptoms of allergic rhinitis. 66 patients (placebo and case) with allergic rhinitis were involved and exposed to N. sativa oil. Individual appearances, including sex and age, and characteristics of the disease, including sneezing attack, running nose, nose itching, and nasal blocking, were evaluated for 30 days. The results showed that N. sativa could decrease the mucosal congestion in the nose, itching in nose, running nose, sneezing attacks, turbinate hypertrophy, and mucosal pallor during the first 2 weeks (day 15). The anti-allergic effects of N. sativa components could be utilized against allergic rhinitis. Moreover, N. sativa should be considered for treating allergic rhinitis when the effects of other anti-allergic drugs need to be avoided.[91] An analgesic (also known as a painkiller) is any member of the group of drugs used to relieve pain. Analgesic drugs act in various ways on the peripheral and central nervous systems.[92] The pain relief, induced by analgesics, occurs either by obstructing pain signals reaching the brain or interfering with the brain’s elucidation of the signals, deprived of making anesthesia or loss of consciousness. N. sativa essential oil extract thymoquinone works as a potent analgesic. N. sativa seeds extract on experimentally prompted pain in albino mice holds good analgesic results.[93]

**Antifertility Action**

Antifertility activity of N. sativa provoked significant modification of the vaginal smear of the drug-treated rats. The estrous cycle so modified was characterized by prolonged diestrus and proestrous stage with consequent temporary inhibition of ovulation. Post-coital contraceptive efficacy of the hexane extract of seeds of N. sativa in rats was observed and found satisfactory.[94,95] In the study hexane extract of the seeds of N. sativa L. prevented pregnancy in Sprague-Dawley rats treated orally at 2 g/kg daily dose on days 1-10 post-coitum. Substantial antifertility action was detected in its column fractions and subfractions. At contraceptive dose, the active hexane extract showed only mild uterotrophic activity, equivalent almost to 0.002 mg/kg dose of 17 varies. It is directly related to Ethinylestradiol but was lacking in any estrogenicity in the immature rat bioassay. Thymoquinone from N. sativa is responsible for many of the pharmacodynamic effects.[96]

**Anthelmintic Action**

Anthelmintics or antihelminthics are drugs that expel parasitic worms (helminths) from the body, by either stunning or killing them. They may also be called vermifuges (stunning) or vermicides (killing).[97] N. sativa holds good anthelmintic property. Larvicidal activity has been reported against Culex pipiens when ether extract is used at 151.7 ppm.[98]

**Antioxidant Action**

N. sativa has been reported to possess significant antioxidant activity.[99] An active component of N. sativa L. thymoquinone (lipophylic) exhibits a structural resemblance with the natural mitochondrial electron carrier, ubiquinone. It is of interest whether the suggested antioxidant effect of thymoquinone in cells can be explained by its interaction with the mitochondrial respiratory chain. Antioxidant Effects of N. Sativa in the treatment of experimentally induced rhinosinusitis revealed its role in scavenging reactive oxygen species.[100] It was suggested that dietary supplementation of black seeds powder inhibits the oxidative stress caused by corn oil (oxidized) in rats.[101] It was also reported that oral feeding of the diet containing black seed powder at 10% level antagonized the oxidative stress induced by hepato-carcinogens like dibutyrylamine and Sodium Nitrate in Swiss albino rats, by normalizing GSH and NO levels (Gendy et al, 2012).[102] The black seed oil and thymoquinone by intraperitoneal injection were found to exhibit protective effects on lipid peroxidation process during an ischemic-reperfusion injury in rat hippocampus.[36] When treated with N. sativa for 6 weeks, broiler chicks protected the liver from oxidative stress by raising the activities of enzymes such as myeloperoxidase, glutathione-S-transferase catalase, adenosine deaminase, and by decreasing hepatic lipid peroxidation.[103] The crude methanolic extract of N. sativa seed cake was found to show significant antioxidant properties under in vitro systems.[104] The modulatory effect of thymoquinone on erythrocyte lipid peroxidation and antioxidant status during 1,2-dimethylhydrazine- (DMH-) induced colon carcinogenesis (after initiation in male Wistar rats) was investigated. It was found that thymoquinone pre-treatment restored the increased level of malondialdehyde and conjugated diene levels, and augmentation of enzyme activities like catalase, glutathione peroxidase, and superoxide dismutase was noted. Thymoquinone was a useful compound in preventing DMH-induced erythrocyte damages.[105]

**Anti-cancerous Action**

Potential of N. sativa has been explored for its anti-cancerous activity.[106,107] Ait Mbarek et al., (2007) has worked to investigate into the anti-tumor properties of N. sativa extracts and found positive results.[108] Similarly, good anti-tumor activity was found by Musa et al. (2004).[109] The anti-cancerous property of N. sativa is attributed to its phytochemical thymoquinone. Apart from thymoquinone, flavonoids do have a preventive role in cancer therapy via
the effect on signal transduction in cell proliferation.[10,11] It has also been reported that many such antioxidants can inhibit cancer cells’ proliferation. Ivanovic et al. (2006) by an extensive study, reported the effect of thymoquinone in in-vitro experiments, using L929 mouse fibroblasts and two tumor cell lines (squamous cell carcinoma (SCC VII) and fibrosarcoma (FsaR). The cells were cultured with 0.1 or 0.01 mg/ml thymoquinone or thymohydroquinone (phytochemicals of N. sativa) for 24 hours, and cytotoxicity assay was performed. For in vivo anti-tumor efficiency evaluation of these compounds, two murine tumor models, fibrosarcoma (FsaR) and squamous cell carcinoma (SCC VII) were used. The used dose was equal for both substances. The anti-tumor effect of 4 intratumoral injections of thymoquinone and thymohydroquinone at the dose of 5 mg/kg was evaluated by comparison of tumor growth kinetics between treated and control animals. This in-vitro study showed that thymoquinone and thymohydroquinone exhibit statistically significant cytotoxic activity ($p < 0.01$).[12,13]

**Carminative Action**

A carminative, also acknowledged as carminativum is a herb or preparation that either prevents gas formation in the gastrointestinal tract or facilitates the expulsion of said gas, thereby, combatting flatulence.[14] Carminatives have been shown to decrease lower esophageal pressure, which on the other hand increases the risk of Gastroesophageal reflux disease (GERD) or ‘heartburn’. Some studies have reported carminative effects of *N. sativa* as its constituent thymoquinone could protect the gastric mucosa against the injurious effect of absolute alcohol and promote ulcer healing.[14]

**Neuroprotective Action**

Studies have been conducted on *N. sativa* to find effects on the central nervous system (CNS). Neuropharmacological activity of *N. sativa* L. extracts was studied and it observed that *N. sativa* possesses the potential to alter the central nervous system (CNS). Furthermore, the neuro-pharmacological activity of *N. sativa* is still under investigation. It has been shown that *N. sativa* causes morphological improvement on toluene-induced neuro-degeneration in the frontal cortex and brain stem. Moreover, the distorted nerve cells in the hippocampus were also absent in *N. sativa* treated rats. Thus *N. sativa* may indicate its usefulness as a potential treatment on neurodegeneration after chronic toluene exposure in rats.[15,16]

**Conclusion**

*Nigella Sativa* is a miraculous herb. Of the traditional remedies, prescriptions of *Nigella sativa* for the treatment of various diseases are well known since prehistoric era. It has miraculous properties. It has an anti-microbial effect, hepatoprotective effect, anti-diabetic effect, anti-inflammatory and analgesic effect, antifertility effect, anthelmintic effect, antioxidant effect, anti-cancerous effect, carminative effect, neuroprotective effect and many more effects. Therapeutic effects of *Nigella sativa* are thought to be due to nigellone and thymoquinone contents. However, future research is needed for the standardization of the active constituents and their efficacy in human subjects.

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