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Page 58-75

BLACK SEED (NIGELLA SATIVA) IN ISLAMIC, INDIAN, CHINESE HERITAGE AND MODERN MEDICINE: A BRIEF REVIEW

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ABSTRAK

Jintan hitam, atau Nigella sativa, merupakan tanaman obat yang dikenal luas dan digunakan dalam skala global. Studi ini meneliti penggunaan jintan hitam secara historis dalam pengobatan tradisional dan modern, serta khasiatnya sebagai antibakteri, antijamur, antivirus, dan antiparasit. Data dikumpulkan dengan menggunakan berbagai mesin pencari ilmiah terkemuka, seperti Google Scholar, ScienceDirect, Taylor & Francis, dan Wiley Library…dll. Data tersebut diproses dan dianalisis oleh tim penulis untuk mencapai kesimpulan berikut: Kami sangat menganjurkan tenaga medis untuk menyelidiki aplikasi terpadu jintan hitam sebagai agen terapeutik bersama senyawa kontemporer, mengingat khasiat antimikroba jintan hitam yang komprehensif terhadap bakteri patogen, virus, jamur, dan parasit.

Kata kunci: Nigella sativa, jintan hitam, biji hitam, Habbah Sawdaa, Tibb-e-Nabawi

ABSTRACT

Black cumin, or Nigella sativa, is a medicinal plant that is extensively recognised and used on a global scale. This study examines the historical use of black seed in both traditional and modern medicine, as well as its antibacterial, antifungal, antiviral, and anti-parasitic properties. Methods: Data were collected by employing a variety of reputable scientific search engines, such as Google Scholar, ScienceDirect, Taylor & Francis, and Wiley Library…etc. The data was processed and analysed by the author's team to reach the following conclusion: We strongly encourage medical personnel to investigate the integrated application of black cumin as a therapeutic agent alongside contemporary compounds, given the comprehensive antimicrobial efficacy of black seed against pathogenic bacteria, viruses, fungi, and parasites.

Keywords: *Nigella sativa, black cumin, black seed, Habbah Sawdaa, Tibb-e-Nabawi*

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e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

1. INTRODUCTION

The seeds of *Nigella sativa* L., commonly known as black seed, have been used in traditional medicine by many Asian, Middle Eastern, and Far Eastern Countries to treat headache, coughs, abdominal pain, diarrhea, asthma, rheumatism, and other diseases (Gali-Muhtasib, El-Najjar, and Schneider-Stock 2006). *Nigella sativa* has been used since ancient times, when a scientific concept about the use of medicinal plants for treating human illnesses and alleviating their sufferings was yet to be developed. It has a strong religious significance, as it is mentioned in the books of Islam and Christianity. In addition to its historical and religious significance, it is also mentioned in ancient medicine. It is widely used in traditional systems of medicine for some diseases, including asthma, fever, bronchitis, cough, chest congestion, dizziness, paralysis, chronic headache, back pain, and inflammation (Ahmad et al., 2021). Pharmacological studies on *Nigella sativa* have confirmed its anti-diabetic, antitussive, anticancer, antioxidant, hepatoprotective, neuroprotective, gastroprotective, immunomodulator, analgesic, antimicrobial, anti-inflammatory, spasmolytic, and bronchodilator activity (Ahmad et al., 2021). *Nigella sativa* can improve glycemic status and lipid profile in diabetes models (Heshmati and Namazi 2015). Black seed oil is a natural remedy for various diseases, including various allergies. Black seed oil, therefore proved to be an effective adjuvant for the treatment of allergic diseases (Kalus et al. 2003). This study examines the historical use of black seed in both traditional and modern medicine, as well as its antibacterial, antifungal, antiviral, and anti-parasitic properties.

2. METHODS

Data were collected by employing a variety of reputable scientific search engines, such as Google Scholar, ScienceDirect, Taylor & Francis, and Wiley Library…etc. The data was processed and analysed by the author's team to reach the conclusion

3. DISCUSSIONS

The average height of this short plant varies between 20 and 30 cm (Table 1). The leaves are fine and deeply segmented, and the stem is branched. The Nigella plant exhibits a well-developed tap root despite its small size. It produces five to ten petal flowers that are either white or pale blue. Being a hermaphrodite, the Nigella plant produces large, bulbous fruits along with five to six elongated, fused carpels and many stamens. Three to seven follicles or compartments make up the capsule. Several black seeds are kept in each compartment. Little triangular seeds of a black color are produced by Nigella sativa. Nigella sativa seeds are carried in the plant capsule, containing five to six compartments. Every section of the capsule that contains the seed terminates in a lengthy protrusion. Nigella is a hardy plant that thrives in a

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

range of soil types. In some parts of the world, these plant seeds can be easily seen in Figure (1) (Khan & Rehman, 2021; Thakur et al., 2021).

Table 1. Scientific classification of Nigella sativa (Khan & Rehman, 2021):

Kingdom	**Plantae**
Sub-kingdom	Tracheobionta
Sub-division	Spermatophyta
Phylum	Magnoliophyta
Class	Magnoliopsida
Order	Ranunculales
Family	Ranunculaceae
Genus	Nigella
Species	sativa

Figure (2) Nigella sativa (Köhler 1887)

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

3.2 HISTORY OF NIGELLA SATIVA

Nigella sativa in Arab Islamic and Unani medicine:

For a long time, medicinal plants have been used as a source for preparing herbal medicines because they are safe when compared to modern chemical drugs (Ahmad, Husain, Mujeeb, Khan, Najmi, & Siddique, 2013). The dawn of modern medicine did not emerge from nothing; rather, at the beginning of its development, it relied on traditional medicine that was prevalent in the Islamic and Arab regions, which in turn was influenced by what was prevalent in countries of the ancient world such as Egypt, India, and China. Accordingly, Islamic medicine represents the intermediate link between traditional medicine prevalent in those countries and modern medicine that the West began relying on this Islamic medicine. These are historical facts and not just opinions or beliefs.

It was narrated that 'Uthman bin 'Abdul-Malik said: "I heard Salim bin 'Abdullah narrating from his father that the Messenger of Allah (PBUH) said: 'You should eat this black seed, for in it there is healing from every disease, except the Sam (death).'" Sunan Ibn Majah 3448

The narration provided is a hadith from Sunan Ibn Majah, which discusses the benefits of black seed, known as Habbah Sawdaa and/or Habat albaraka in Arabic. The hadith states that the Prophet Muhammad (PBUH) recommended the consumption of this black seed, asserting that it contains healing properties for every disease except for death itself. This statement emphasizes the significance attributed to black seed in Islamic tradition as a remedy for various ailments (Ismail and Yaheya 2009). The phrase "except the Sam" refers to death, indicating that while black seed may aid in healing many conditions, it cannot prevent death, which is an inevitable part of life (Ijaz et al. 2017).

In traditional humoral and Unani medicine, Nigella sativa is linked to a hot and dry temperament. Based on ancient Greek and Persian medical traditions, this classification highlights the significance of balancing the body's temperaments through natural properties like food, herbs, and plants that can affect mood, temperament, and health (Khan & Rehman, 2021; Yaser Abdelhamid, 2012). **Table (2)**

Table (2): Properties of Nigella Sativa That Are Hot and Dry:

Hot properties	Dry properties
The "hot" quality of Nigella sativa refers to its capacity to promote energy, raise body temperature, and stimulate circulation, which are thought to have a stimulating and restorative effect on the body	The "dry" quality of Nigella sativa denotes its drying or astringent properties, which may help reduce excess moisture in conditions like fluid retention or phlegm.
This can be helpful for conditions like fatigue, poor circulation, some forms of arthritis, or gastrointestinal problems that make the body feel cold or lethargic.	People with excessive moisture or phlegm, which can show up as mucus, slow digestion, or even excess weight, are believed to benefit from dry materials.
Because black seeds can make symptoms like irritability, anger, or inflammation worse, it might not be appropriate for people who have excess heat.	However, people who already have dry skin, dry eyes, or digestive issues that cause dryness may need to use black seed more cautiously because it can exacerbate dry conditions.

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

Nigella sativa in TCM:

A subset of the holistic traditional medical approach that has developed over thousands of years is traditional Chinese medicine (TCM). It views health as a state of equilibrium between the body and the mind. Chinese medical professionals have been known to treat illnesses by using a variety of body and mind techniques. According to ancient Chinese culture, humans are interconnected with nature, which uses its many forces to govern them, and are therefore microcosms of the universe. One of the fundamental ideas of TCM is the preservation of equilibrium between health and illness. "*Hei Thong Can Zi*" is the traditional Mandarin name for N. sativa. TCM has utilized Nigella seeds for their antiviral, antibacterial, and ability to treat pulmonary conditions (Khan & Rehman, 2021; Usmani & Almoselhy, 2024).

Nigella sativa in Ayurveda:

Nigella sativa "Kalonji" has been utilized for centuries as a traditional plant (Sharma et al., 2009). In the Ayurvedic medicine system, the seeds of Nigella sativa are effective against a variety of diseases, including cough, asthma, chronic headache, migraine, chest congestion, dysmenorrhea, obesity, diabetes, hemiplegia, infection, inflammation, rheumatism, hypertension, and gastrointestinal issues such as dyspepsia, flatulence, dysentery, and diarrhea. The plant is also described in terms of its usage as a diuretic, emmenagogue, anthelmintic, and carminative. Abscesses, nasal ulcers, orchitis, eczema, and swollen joints are also treated with it (Namazi et al. 2018). The oil of the kalonji seeds is regarded as a local anesthetic (Mousavi et al. 2018). The seeds and seed oil of Nigella sativa are edible and are also used in traditional dishes. It is employed as a flavoring agent in pickles.

The Rasa Panchak of Nigella sativa "kalonji": Ayurveda posits that kalonji enhances the pitta dosha "Fire +Water elements", calms the Vata dosha "Air element", and diminishes the Kapha dosha "Earth +Water elements". The plant is primarily preferred for Vata-Kapha disorders and is suitable for both Kapha and Vata body types. It is not appropriate for individuals with a Pitta body type or pregnant women. It is beneficial in the reduction of the formulation of Ama Dosha "Fire element" (Sharma, 2006; Thakur & Chaudhary, 2021).

Nigella sativa "Kalonji" benefits and uses: Ayurveda recommends kalonji use in Halitosis (Bad Breath), anorexia, indigestion and flatulence, asthma, dysmenorrhea and galacotogenic action (Hosseinzadeh, Eskandari, and Ziaee 2008)(Mohammad Hossein Boskabady et al. 2007).

4. DISCUSSION

Extensive research was conducted to determine the composition of the black cumin seed. The ingredients of Nigella sativa seed consist of volatile and non-volatile oils, protein, carbohydrates, fiber, alkaloids, tannins, saponins, minerals such as iron, calcium, potassium, magnesium, zinc, and copper, vitamin A and C, thiamine, niacin, pyridoxine, and folate (Al-Mahasneh, Ababneh, and Rababah 2008; Güllü and Avcı 2013; Salama 2010) **(Figure 3).**

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

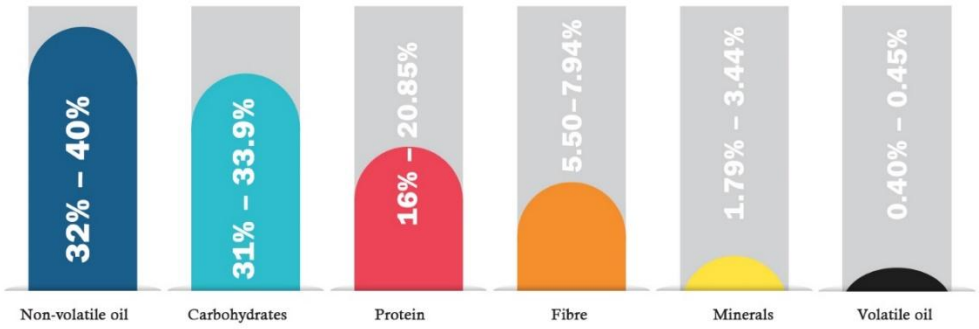


Figure 2: Black seed components (Majid 2018)

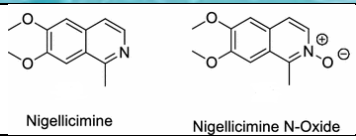
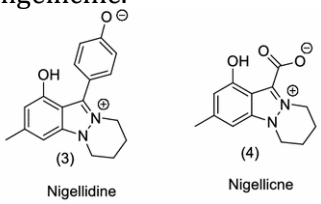
Chemical Composition

The geographical locations in which the black cumin seed is grown have an impact on its properties. The range demonstrates that the percentages of free fatty acids in various types of oils vary depending on the geographical location and storage conditions. Although the properties of the grain differ, its chemical components remain constant, with some of its values changing from one region to another (Farhan, Salih, and Salimon 2021). **Table (3)**

Table (3): Chemical composition of Nigella sativa seeds.

Components	Contains of:	References
Fatty acids		
Non-volatile oils (Unsaturated fatty acids)	Arachidonic, eicosadienoic, linoleic, linolenic, oleic, almitoleic, palmitic, stearic and myristic acid as well as beta-sitosterol, cycloeucalenol, cycloartenol, sterol esters, sterol glucosides, avenasterol-5-ene, avenasterol-7-ene, campesterol, cholesterol, citrostadienol, lophenol, obtusifoliol, stigmastanol, stigmasterol-7-ene, β-amyrin, butyro-spermol, cycloartenol, 24-methylene-cycloartanol, taraxerol and tirucallol.	(Majid 2018; Staphylakis and Gegiou 1986; Tembhurne et al. 2014)
Volatile oil (Saturated fatty acids)	Nigellone is the only component of the carbonyl fraction of the oil, thymoquinone, thymohydroquinone, dithymoquinone, thymol, carvacrol, α and β-pinene, d-limonene, d-citronellol and p-cymene.	(Aftab Ahmad et al. 2013; Enomoto et al. 2001; Majid 2018; Tembhurne et al. 2014)
	Volatile oil of the seed also contains p-cymene, carvacrol, t-anethole, 4-terpineol, longifolene, aliphatic alcohol, melanthin, melanthigenin, bitter principle, tannin, resin, protein, reducing sugar, glycosidal saponin and 22-dien-3-β-D-gluco-pyranoside.	
Organic compounds		
Alkaloids	Isoquinoline alkaloid that includes: nigellicimine, nigellicimine n-oxide.	(Aftab Ahmad et al. 2013; M. A. Khan 1999;

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

	 Nigellicimine Nigellicimine N-Oxide Pyrazol alkaloid that includes: nigellidine and nigellicine.  (3) Nigellidine (4) Nigellicne	Mehta, Pandit, and Gupta 2009; Tembhurne et al. 2014)
Phenolic compounds	The isolation and structural elucidation of the three new flavanol triglycosides (6a-c)	(Merfort et al. 1997)
The most important active constituents		
Thymoquinone (30%-48%), thymohydroquinone, dithymoquinone, p-cymene (7%-15%), carvacrol (6%-12%), 4-terpineol (2%-7%), tanethol (1%-4%), sesquiterpene longifolene (1%-8%) α-pinene and thymol etc.		(Nickavar et al. 2003)
Minerals		
Fe, Ca, K, Zn, P, Cu		(Aftab Ahmad et al. 2013; Tembhurne et al. 2014)
Other compounds		
Saponin and alpha hederine and in trace amount it carvone, limonene and citronellol.		(Aftab Ahmad et al. 2013; Tembhurne et al. 2014)

Nutritional value of black seeds

Nigella sativa seeds from a variety of countries have been analyzed and demonstrated to possess a high nutritional potential. **Table (4)**

Table (4): Nutritional value of Nigella sativa seeds.

Nutrient	Quantity	References
Protein	~22%	(Abdel-Aal and Attia 1993; Ara et al. 2020; M. A. Khan 1999; Takruri and Dameh 1998)
Fat	38-40%	
Carbohydrates	~32%	
Iron	105 mg/kg	(Siong, Choo, and Shahid 1989a)
Copper	18 mg/kg	(Siong, Choo, and Shahid 1989b)
Zinc	60 mg/kg	
Phosphorus	527 mg/kg	
Calcium	1860 mg/kg	
Thiamin	15.4 mg/kg	(Takruri and Dameh 1998)
Niacin	57 mg/kg	
Pyridoxine	5.0 mg/kg	
Folic acid	160 pg/kg	

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

Biological properties:

The biological activities of Nigella Sativa have been extensively studied, particularly in the Islamic world. The medicinal properties of this plant have been acclaimed, with various pharmacological effects of Nigella sativa seeds being highlighted, including antibacterial activity (Majid 2018), antiviral activity (Mohamed Labib Salem and Hossain 2000), Antifungal activity (Salih Hamad Mohamad Aljabre et al. 2005), Anti-parasitic activity (Forouzanfar, Bazzaz, and Hosseinzadeh 2014) and so on of other effective activities. (**Figure 3)**

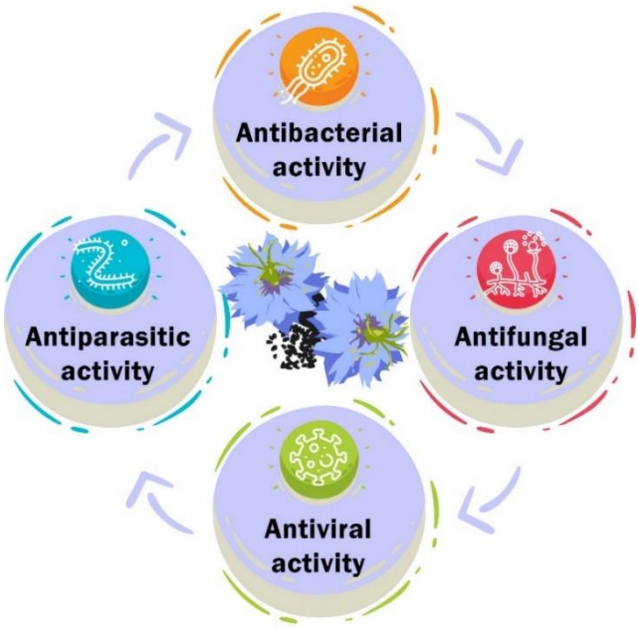


Figure 3 Biological properties of Nigella sativa

Antibacterial activity:

The antimicrobial properties of herbal plants and their extracts have been acknowledged since ancient times, with laboratory efforts to demonstrate these qualities began in the early (Dorman and Deans 2000; Forouzanfar, Bazzaz, and Hosseinzadeh 2014). Various crude extracts of Nigella Sativa demonstrated antimicrobial effectiveness against a range of bacterial strains, including both gram-negative and gram-positive bacteria. Crude extracts of Nigella Sativa demonstrated a promising effect against certain test organisms. The most effective extracts of Nigella Sativa were the crude alkaloid and water extracts. Gram-negative isolates demonstrated greater susceptibility compared to gram-positive isolates (Hajhashemi, Ghannadi, and Jafarabadi 2004). Thymoquinone derived from the seeds of Nigella Sativa demonstrated a wide range of activities against various strains of both gram-positive and gram-negative bacteria, including *Bacillus, Listeria, Enterococcus, Micrococcus, Staphylococcus, Pseudomonas,*

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https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

Escherichia, Salmonella, *Serovar,* and *Vibrio parahaemolyticus*, as well as inhibiting bacterial biofilm formation (Abdallah, 2017; Ahmad et al., 2021; Aljabre et al., 2015). Methicillin-resistant Staphylococcus aureus (MRSA) is among the most frequently encountered pathogens in both laboratory and clinical settings. All tested strains of MRSA demonstrated sensitivity to the ethanolic extract of Nigella Sativa seeds at a concentration of 4 mg/discs, with the extract exhibiting a minimum inhibitory concentration (MIC) range of 0.2 - 0.5 mg/ml (Hannan et al. 2008). Furthermore, black seed (2 g/day) demonstrated a clinically significant anti-H. pylori effect comparable to triple therapy (Salem et al., 2010), providing a scientific foundation for the investigation of potential applications of this esteemed seed in the treatment of H. pylori-induced gastric ulcers (Yimer et al. 2019). The inhibitory effect of some types of bacteria is shown in Table **(5).**

Table (5). Antibacterial effects of Nigella sativa.

Microorganism	**Growth Inhibition***	**Method**	**Ref**
Listeria monocytogenes	31.50±1.0 mm	Seed oil	(Abdallah 2017; Nair, Vasudevan, and Venkitanarayanan 2005)
Pseudomonas aeruginosa	20 mm	Seed (Aqueous extract) con. 100 mg/m	(Hasan, Nawahwi, and Ab Malek 2013)
Streptococcus pyogene	15 mm		
Klebseilla pneumoniae	11 mm	Seed (Aqueous extract) con. 50 mg/m	
Proteus vulgaris	12 mm		
Streptococcus pyogene	10 mm		
Streptococcus mutans	24.5 ± 0.71 mm	Seed (Disc diffusion method) (150 lg/disque)	(Harzallah et al. 2011)
Streptococcus mitis	22 ± 1.41 mm		
Enterococcus faecalis	9 ± 0.00 mm		
Enterococcus faecium	9.5 ± 0.71 mm		
Streptococcus salivarius	9.5 ± 0.71 mm		

* Means of inhibition zone mm ± SD

Antifungal activity:

The widespread problem of resistance is attributed to the excessive use of antifungal drugs. Researchers have shown interest in plant-based medicines as potential alternative treatments for fungal infections (Ahmad et al., 2021). The antifungal activity primarily results from the presence of Thymoquinone in

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

Nigella Sativa. Thymoquinone, thymohydroquinone, and thymol have demonstrated antifungal activity against dermatophytes, moulds, and yeasts (Taha, Azeiz, and Saudi 2010). The essential oil of Nigella Sativa from various origins has been documented to exhibit moderate inhibitory effects against pathogenic strains of yeasts, dermatophytes, and non-dermatophyte filamentous fungi, as well as aflatoxin-producing fungi. The Nigella Sativa treatment focused on the cell wall, plasma membrane, and membranous organelles, particularly in the nuclei and mitochondria, as demonstrated by the morphology of these toxigenic fungi (Hojjatollah Shokri 2016; Yimer et al. 2019). The inhibitory effect of some types of fungi is shown in Table **(6).**

Table (6). Antifungal effects of Nigella sativa.

Microorganism	Growth Inhibition*	Method	Ref
Fusarium solani	28±1.5	Seed oil (Ethanol Extract)	(Al-Ameedy and Omran 2019)
Candida albicans	35 mm	Seed oil (Disc diffusion)	(Naeini et al. 2009)
Candida zeylanoides	40.8 mm	Seed oil (Disc diffusion)	(H Shokri, Sharifzadeh, and Tamai 2012)
Microsporum gypseum	38 mm	Seed oil (Disc diffusion)	(Sunita and Meenakshi 2013)
Aspergillus niger	0.33 mm	Seed oil (Agar diffusion)	(Sitara et al. 2008)
Aspergillus flavus	45.7 mm	Seed oil (inverted petri plate)	(Singh et al. 2014)
	8.9 mm	Seed (Ethanol Extract)	

* Means of inhibition zone mm ± SD

Antiviral activity:

Apoptosis is induced by viral infections resulting in lymphocyte depletion within the host cell, and antioxidants can impede apoptosis triggered by viruses while also inhibiting viral replication in target cells; thus, antiviral and antioxidant effects are interconnected (Peterhans 1997). Nigella sativa seed oil was observed to reduce viral load in a murine model, specifically in cytomegalovirus-infected mice, to undetectable levels in the liver and spleen following 10 days of intraperitoneal administration. This may have resulted from the augmented quantity and functionality of CD4(+) T cells and heightened synthesis of interferon-gamma (Forouzanfar et al., 2014; Salem & Hossain, 2000). In a study, 450 mg capsules of Nigella sativa oil were administered three times daily to patients infected with the hepatitis C virus for a duration of three months. Overall, there was substantial enhancement in oxidative stress, a decrease

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https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

in viral load, and significant improvements were observed in albumin, total protein, platelet, and RBC levels. The enhancement of RBC count contributes to the reduction of membrane lipid peroxide levels and diminishes the likelihood of hemolysis (Barakat, El Wakeel, and Hagag 2013; Forouzanfar, Bazzaz, and Hosseinzadeh 2014). Demonstrated that a 46-year-old HIV positive patient achieved complete recovery and seroreversion after receiving 10 mL of black seed twice daily for 6 months (Onifade, Jewell, and Adedeji 2013). Currently, HIV/AIDS poses a significant global threat, and in this context, Nigella sativa may serve as a potential natural treatment for this chronic infectious disease, pending comprehensive validation of its therapeutic efficacy through additional research (Yimer et al. 2019).

It is documented that black seed contains compounds such as hederagenin, nigelledine, thymohydroquinone, dithymoquinone, thymoquinone, and α-hederin, which exhibit varying degrees of affinity for the SARS-CoV-2 enzyme and protein. These compounds possess the capacity to actively regulate the attachment and replication capabilities of SARS-CoV-2 at the host cell receptor site. Numerous studies have demonstrated that this herb is an effective phytotherapy candidate for COVID-19. Furthermore, the results of preclinical trials must be followed by a Phase I clinical trial (Esharkawy, Almalki, and Hadda 2022; Koshak and Koshak 2020).

Antiparasitic activity:

Nigella sativa seeds exhibit schistosomicidal properties against Schistosoma mansoni (in vitro), demonstrating a potent biocidal effect on all parasite stages and an inhibitory effect on the oviposition of adult female worms (Abd El-Hack et al. 2016; Assi et al. 2016). An ointment derived from Nigella sativa seeds significantly reduced and suppressed the inflammatory responses to experimentally induced cutaneous leishmaniasis in mice following subcutaneous inoculation of Leishmania major at the abaxial base of the tail (Bafghi et al. 2011). The impact of Nigella sativa seeds on children naturally infected with cestode worms was examined. A solitary oral dose of 40 mg/kg of ethanolic extract of Nigella sativa, devoid of adverse effects at the tested doses, reduced the percentage of fecal eggs (Akhtar and Riffat 1991). The administration of Nigella sativa extract at a dosage of 1.25 g/kg significantly reduced Plasmodium yoelii infection in mice by 94%, whereas chloroquine exhibited an effect of only 86% relative to the untreated group. The methanolic extract of Nigella sativa demonstrated superior parasite clearance and restoration of altered biochemical markers due to Plasmodium yoelii infection compared to chloroquine (Okeola et al. 2011). Therefore, evaluating Nigella sativa as a potential antiparasitic agent will be significantly beneficial following additional research into its therapeutic, preventive, and chemopreventive properties, especially in light of the rising resistance to antimalarial drugs (Forouzanfar, Bazzaz, and Hosseinzadeh 2014).

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

Medical properties:

In recent decades, a significant amount of research has been conducted on Nigella sativa, which has revealed that it possesses a variety of pharmacological actions and medicinal properties. *Nigella sativa* has been discovered to possess Anti-parasitic (Forouzanfar, Bazzaz, and Hosseinzadeh 2014) and Painkiller (Salem & Hossain, 2000) properties. The anthelmintic properties of nigella seeds are attributed to thymoquinone, dithymoquinone, and pipene, as well as cymene (Mohammadian, Rahmani, and Rassouli 2008). Additionally, it functions as an antipyretic by demonstrating a cooling effect that is beneficial for reducing fever. Phenolics and flavonoids in *Nigella sativa* induce profuse sweating, which aids in the cooling process during fever and promotes the release of toxins. The cyclooxygenase enzymes are blocked by the active component of nigella seeds, which inhibits the production of prostaglandins throughout the body (Gilani, Jabeen, and Khan 2004). *Nigella sativa* functions as an emmenagogue by increasing the production of prostaglandins, which in turn stimulate menstrual flow and activity. It also functions as a galactogogue, promoting the secretion of prolactin by increasing the secretion of dopamine, which in turn stimulates the action of milk in new mothers (M H Boskabady, Mohsenpoor, and Takaloo 2010; Shilpa, Yogesh, and Prashant 2019). It also functions as a carminative, promoting digestion and the expulsion of gas from the stomach and intestines. The gastric foam is broken up by the essential components of Nigella, reducing gastric distention. Some studies also indicate that black seed has an effective effect on healing stomach ulcers (Bukhari et al. 2011; Rajkapoor, Anandan, and Jayakar 2002). It also functions as a diuretic by inducing urination to alleviate bloating and eliminate excess water from the body. Thymoquinone, an active component of nigella, stimulates urine production, thereby impeding the kidneys' capacity to reabsorb sodium (Abul-Nasr, El-Shafey, and Osfor 2001). Additionally, kidney stones were successfully treated with Nigella seeds (Mohammadian, Rahmani, and Rassouli 2008). Thymoquinone, a component of Nigella sativa seeds, exhibits antitussive properties. These findings indicate that thymoquinone likely exerts antitussive effects through opioid receptors (Hosseinzadeh, Eskandari, and Ziaee 2008). Also, Nigella sativa inhibits or prevents the development of malignant tumors (Salim 2010; Shafi et al. 2009; Zaunschirm et al. 2018). Alkaloids trigger the development of proliferative tumors by inhibiting the biosynthesis of nucleic acids. Nigella functions as an anti-tumor agent by inducing cell death (Salem et al., 2011). Additionally, a placebo was administered to 99 diabetes patients in an experimental randomized controlled trial, while two treatment groups administered oral black seed oil. A significant reduction in glycated hemoglobin A1c and random blood sugar levels was observed after administering 1.5 and 3 mL/day of black seed oil for 20 days (Rachman and Darmawan 2017). The various doses of Nigella sativa seed (1, 2, and 3 g/day) were also assessed in patients with DM-2. The administration of one gramme of Nigella sativa seed per day resulted in an increase in high-density lipoprotein cholesterol (HDL-c) levels after three months, whereas two and

e-ISSN: 2828-4569,Volume 6, No 2, 2025
https://doi.org/10.55116/IJICM.V6I2.104
Page 58-75

three grammes of Nigella sativa seed per day significantly decreased serum levels of total cholesterol (TC), triglycerides (TG), and low-density lipoprotein cholesterol (LDL-c) and increased plasma HDL-c (Kaatabi et al. 2012).

5. CONCLUSION

The acceptance and demand for traditional plants are increasing worldwide, as they are increasingly being used as complementary and integrative treatments. Nigella sativa, a significant plant in the Ranunculaceae family, was the subject of the current literature review. This plant has a variety of pharmacological activities and nutraceutical applications. Nigella sativa contains a diverse array of components, such as thymoquinone, dithymoquinone, and thymohydroquinone, all of which have beneficial effects on human health in the context of various illnesses, according to research. Nigella sativa modulates numerous signalling pathways to demonstrate significant antibacterial, antifungal, antiviral, and anti-parasitic properties. Since there is a difference in the results of studies conducted on black seed, we need to study the variation in results due to geographical differences and the possible side effects that black seed may have on laboratory mice. The active ingredients of Nigella sativa plants must be meticulously standardized before their use in various experimental studies. A rigorous validation of Nigella sativa is required to accurately ascertain the association between conventional plant-drug interactions. To assess the safety and efficacy of Nigella sativa and its Phyto-constituents against experimental animal models, additional preclinical research is necessary to determine the efficacy of Nigella sativa and its active constituents in humans for the integrative approach to treat infections and join modern antimicrobial agents in clinical practice.

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