

## Review



### **NIGELLA SATIVA: A COMPREHENSIVE REVIEW ON ITS HISTORY, TRADITIONAL USES, ADULTERATION, ALLIED SPECIES, PHYTOCHEMISTRY, AND APPLICATIONS IN COSMETICS.**

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#### **ABSTRACT :**

For centuries, black cumin, also known as *Nigella sativa*, a flowering plant of the Ranunculaceae family, has been used medicinally. An overview of *Nigella sativa*'s pharmacological, botanical, phytochemical, and therapeutic applications is given in this comprehensive review. It is grown primarily as a rabi crop; its seeds are sown during the cold months and harvested in the spring. Harvest the seeds when the pod is slightly green to preserve the aromatic oil. Pharmacological effects. These incorporate antioxidant, anti-inflammatory, anti-inflammatory, anti-diabetic and anti-cancer properties. In cosmetics, *N. sativa* is used for its beneficial effects on the skin and hair. These oils and extracts have been formulated in various ways for their antioxidant, anti-inflammatory, and anti-inflammatory properties. Home remedies that use *Nigella sativa* include face masks, hair masks, and toothpastes that utilize its nourishing and rejuvenating properties. When used for a long time. The commercially available formulation is *N. sativa* includes supplements, oils, and personal care products designed to harness its healing abilities. Its rich phytochemical composition and diverse pharmacological activities make it a good candidate for the development of new drugs and cosmetics.

**KEYWORDS:** *Nigella sativa*, Cultivation and Collection, phytoconstituents, cosmetic applications

RECEIVED ON:

21-03-2025

REVISED ON:

07-04-2025

ACCEPTED ON:

13-04-2025

Access This Article Online:

Quick Response Code:



Website Link:

<https://jahm.co.in>

DOI Link:

<https://doi.org/10.70066/jahm.v13i3.1631>

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CITE THIS ARTICLE AS

Sanket R. Vakte, Jitendra Y. Nehete. *Nigella sativa*: A Comprehensive Review on Its History, Traditional Uses, Adulteration, Allied Species, Phytochemistry, and Applications in Cosmetics. *J of Ayurveda and Hol Med (JAHM)*. 2025;13(3):72-81



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## 1. INTRODUCTION:

Even in locales where modern medication is accessible, intrigued in therapeutic plants and their areas of utilize has expanded quickly in recent years. Since medicinal plants are the most bioactive drugs utilized in conventional and modern medicine, phytogenic drugs and natural drugs are presently attracting consideration due to their ease of use.[1] The basis of human healing. Herbal products are not only the most effective products, but also non-toxic, and the toxic levels of medicinal drugs are quite low.[2] Cosmetics are drugs used in certain areas of human body. to relax, beautify and improve the body without changing body functions and body structure.[3] Home beauty care products, which are made utilizing different fixings that frame the premise of excellence, where one or more home grown fixings are utilized to give certain benefits of magnificence care items, should to be called "domestic magnificence care items" excellence care items or characteristic cosmetics.[4] Today, people are increasingly using herbal cosmetics, and the demand for cosmetics and skin care products in daily life is also increasing. Because herbal cosmetics are more therapeutic and have no negative side effects, dermatologists attest to their safety.[5] The Greek word "kosmtikos" (to beautify intelligence and might) is a derivative of the English word cosmetics.[6] In old times, it was utilized as a beautiful color to kill animals and enemies by portray their bodies in order to instil fear in the enemy. Cosmetics have existed since 3000 BC in

prehistoric hunting, religion and fighting eras. Later they were used as beauty and health products. A wide range of diseases and skin conditions, such as ageing, acne, wrinkles, and oily skin, can be treated with cosmetics. Your mood, health, and changes in the environment all affect how beautiful your skin looks.[7]

*Nigella sativa* (Ranunculaceae) is a widely used herb worldwide. Numerous medical disciplines, including Siddha, Ayurvedic, Thibhu, and Unani medicine, make extensive use of it. The oil and seeds have a long and illustrious history of use in many different therapies and cuisines.[8] Because of its many beneficial qualities, it has grown to be a significant product in the cosmetics sector. Traditionally recognised for its therapeutic qualities, *N. sativa* is now acknowledged for its potential as a cosmetic, especially in formulations for skin and hair care.

## 2. METHODS:

A systematic search was performed in the following databases: MEDLINE, PubMed, PubMed Central, and Google Scholar using the key terms "Nigella sativa" AND ("Cosmetics" OR "Traditional Uses" OR "Phytochemistry" OR "Adulteration" OR "Allied Species") without any restriction for the time of publication to identify articles published in the English language. Only full-text articles relevant to the cosmetic, ethnobotanical, chemical, and pharmacognostic perspectives of *Nigella sativa* were included in this review.

**Table no. 01: Search Strategy and Filters Applied for Literature Review**

Database	Search Terms Used	Filters Applied	Notes
PubMed (via MEDLINE)	"Nigella sativa" AND ("Cosmetics" OR "Traditional Uses" OR "Phytochemistry" OR "Adulteration" OR "Allied Species")	Language: English 2000 to 2023 articles searched	Searched in Title/Abstract/Keywords
PubMed Central	"Nigella sativa" AND ("Cosmetics" OR "Traditional Uses" OR "Phytochemistry" OR "Adulteration" OR "Allied Species")	Language: English 2000 to 2023 articles searched	Full-text free articles only
Google Scholar	"Nigella sativa" AND ("Cosmetics" OR "Traditional Uses" OR "Phytochemistry" OR "Adulteration" OR "Allied Species")	Language: English 1992 to 2023 articles searched	First 200 results screened manually



**Fig: *Nigella sativa* and its seeds**

(Source:

<https://bs.plantnet.org/v1/image/s/de04d8c746c4da2fc01467283c2ea54e2fece89f>)

#### **HISTORY AND TRADITIONAL USES:**

Referred to as black cumin or *nigella sativa*, this plant has been utilised medicinally since ancient times. *Nigella sativa* seeds have been used for over two thousand years by different cultures, particularly in Middle Eastern and Asian traditional medicine such as Unani, Ayurveda, and Tibu. Historical records, including

Islamic ones, speak of its importance as a good healing agent, often referred as the "seed of blessing" due to its health benefits, including disease prevention, antibiotics for respiratory and health maintenance.[9]

#### **BIOLOGICAL SOURCE AND MICROSCOPY:**

The natural source of *Nigella sativa* is its seeds, which belong to the Ranunculaceae family. Kalonji or black cumin are common names for this plant. Its seeds are little, dull black, to a few degrees triangular and are a fundamental parcel of the plant utilized in medication and brilliance care items.[10]

*Nigella sativa* powder exhibits microscopic features. The epidermal cells of the seed coat are polygonal, thick-walled, and have a slightly wavy pattern. The cells contain brown pigment, which gives the seeds their unique black color. Under the microscope, the testa appears to have a reticulated structure due to its thick walls. The endosperm cells also contain oil globules. The

outer layer of the endosperm consists of thin-walled parenchyma cells containing aleurone grains and oil droplets. Aleurone cells are large and polygonal, high in protein, and small, round or oval aleurone particles. The nearness of little rosettes or crystals of calcium oxalate gems can too be seen in the parenchyma cells.[11]

#### **GEOGRAPHIC DISTRIBUTION, COLLECTION & CULTIVATION:**

Commonly called kalonji or black cumin, The flowering plant *Nigella sativa* belongs to the Ranunculaceae family and is native to Western Asia and Eastern Europe. Parts of Southern Asia, the Middle East, Northern Africa, and Southern Europe are among its many areas of dispersion. This characteristic makes a difference since it adapts to many soil types and climates, making it a versatile crop.

##### **Geographic distribution:**

The natural habitats of *N. sativa* incorporate locales such as Bulgaria, Romania, Cyprus, Turkey, Iran and Iraq. It has too ended up broad in numerous places counting North Africa, parts of Europe and Myanmar in the Distant East. In India, grown in many states, *N. sativa* thrives in a variety of conditions. The crop is especially suited to the climate changes in these locales, from cold, dry zones to hot, wet areas.[12]

##### **Collection & cultivation:**

*Nigella sativa* is commonly grown as a rabi crop in India, planted during the cold months and harvested in spring. The planting season is usually October to November, with harvest time from March to April in many areas and May to June in the mountains. Harvesting the seeds while the pods are still slightly green will help preserve

the aromatic oil and prevent accidental loss. Farmers often perform multiple piercings or harvests to reduce seed loss and increase yields. To maintain their flavour and potency, the seeds are kept in sealed containers in a dark and cool place after drying.[13] *N. sativa* cultivation requires specific soil and climate for good growth. It likes well-drained sandy or loamy soils with a pH of 7 to 7.5. The plant can adapt to a variety of rainfalls and can grow in areas with heavy and moderate rainfall. However, it is important to ensure that the soil is not waterlogged as this can affect the health of the plant. Farmers can also use organic farming methods using manure and organic fertilizers to promote permaculture. The plant requires low maintenance and requires little water and chemical use, parallel to the development of organic farming in many areas.[14]

##### **ADULTERATION AND SUBSTITUTION:**

The possibility of adulteration and alteration in the market poses a problem for consumers and researchers and requires careful management. In the plant industry, *N. sativa* seeds are often confused with *Allium cepa* (onion) seeds, intentionally or unintentionally, because of their similar morphology. Microscopic studies and botanical techniques are important for the design and certification of *N. sativa* herbal drug.[15]

##### **ALLIED SPECIES:**

Other species in the genus *Nigella sativa*, such as *Nigella damascena*, have similar beneficial properties and are receiving expanding research and use in both traditional and modern contexts. In order to determine the molecules, dosage, chemical characteristics, long-

term impacts, and consequences of including *N. sativa* into the diet, more research is necessary.[16]

#### CHEMICAL COMPOSITION:

Numerous active chemicals in various *N. sativa* species have been discovered, isolated, and documented thus far. Carvacrol (6%–12%), 4-terpineol (2%–7%),  $\alpha$ -pinene, thymol, p-cymene (7%–15%), tertiary anisyl alcohol (1%–4%), sesquiterpene longifolene (1%–8%), thymoquinone (30%–48%), thymohydroquinone, and dithymoquinone are the most important constituents. Two types of alkaloids are found in the seeds: pyrazole alkaloids, also known as indazole ring alkaloids, which include nigellidine and nigellixin, and isoquinoline alkaloids, which include nigellixiramine and nigellixiramine-N-oxide. Additionally, *N. sativa* seeds contain anti-inflammatory compounds called saponins and alpha-hederin, a water-soluble pentacyclic triterpene. Additionally, several chemicals, such as citronellol, limonene, and carvone, are present in particular amounts. The quinine component of *N. sativa*, of which thymoquinone is the most common, essentially explains the majority of its pharmacological characteristics. Thymoquinone generates more oligomeric and dithymoquinone molecules when it is at capacity. Protein (26.7%), fat (28.5%), carbs (24.9%), crude fibre (8.4%), and total ash (4.8%) are all present in significant concentrations in *N. lucerne* seed. The seeds also include a variety of vitamins and minerals, including as iron, copper, phosphorus, and zinc. Numerous unsaturated fatty acids are present in the seeds, such as linoleic acid (50–60%), behenic acid (3%), oleic acid (20%), and dihomolinolenic acid (10%). No

more than 30% is made up of saturated fatty acids, such as palmitic and stearic acids. Stigmasterol accounts for 6.57–20.92% of all sterols in black cumin oil assortments from Tunisia and Iran, whereas  $\alpha$ -sitosterol accounts for 44% and 54% of all sterols, respectively.[17-22]

Table no. 2: Chemical Composition of *N. sativa* Seed

Constituents	Concentration (%)
Volatile oil	0.5
Fatty oil	31
Thymoquinone	5.53 in aqueous extract 0.33 in chloroform extract
Stearic acid	28.59
Palmitic	7.3
Linoleic	6.27
Oleic acid	2.75
Protein	16-19.9
Carbohydrates	33.9
Water	6
Fibre	5.5
Trans-anethole	38.3
p-cymene	14.8
Limonene	4.3
Carvone	4
Thymoquinone	0.6
Six compounds of phenyl propanoid	46.1
Nine hydrocarbon monoterpenoid	26.9
Four ketone monoterpenoid	6
Eight hydrocarbons that are not terpenoid	4
Three alcohols that are monoterpenoid	2.7

Two	hydrocarbon	1
sesquiterpenoid		

### COSMETIC USES:

Cleopatra is said to have utilized it for her wellbeing and excellence.[23] Ruler Nefertiti utilized *N. sativa* oil to make her hair and nails sparkle. Black cumin is now used as a skin care product. Some people use it to keep their hair and nails healthy and to improve their health. Clover is an excellent oil to use in emollients, sunscreens, etc. because of its healing, pain-relieving, and skin-cooling properties. This makes it useful in many cosmetics. Black cumin seed extracts, oils, and pastes are used in a variety of cosmetic products for skin, hair and mouth. Black hair oil is believed to have rejuvenating effects because of its antioxidant qualities, which support the skin and neutralise damaging free radicals, reducing the appearance of wrinkles, fine lines, dark spots, and other bad consequences. The best anti-aging ingredients that can be used as anti-aging. *Nigella sativa* seed oil has antibacterial properties against many bacteria, fungi, molds and microbes (counting *Streptococcus mutans*, *Streptococcus mitis* and *Candida albicans*), making it an excellent choice for mouthwash and toothpaste, and it best treats many fungal diseases and conditions such as dandruff. Shampoos, anti-acne hand washes, and skin moisturisers for acne, pimples, and other skin disorders can all include it. For hair growth promotion, black cumin seed oil is one of the best options. Because of their scent, *N. sativa* seeds are utilised in cosmetics. *Nigella sativa* seed oil has a sun protection factor (SPF) value of more than 2. *Nigella*

*sativa* seeds are wealthy in phenolic compounds, making them an excellent remedy in the fight against oral cancer.[24] Numerous parts of the *N. sativa* plant, particularly its seeds and leaves, are recognized for their important properties in corrective applications. These seeds are regularly included to skin care equations for their antioxidant and anti-inflammatory properties. One study found that *N. sativa* seed oil, when applied on the skin, progresses recuperating by decreasing add up to and white blood cells, diminishing tissue harm, and quickening wound healing.[25] For centuries, *Nigella sativa* has been utilized in cosmetics, dermatology, and the treatment of various skin illnesses. In general, burns, wounds, and skin outbreak vulgaris are treated with it. Additionally, it has anti-inflammatory qualities for a range of skin disorders.[26]

### Skin Pigmentation and Vitiligo:

*N. sativa* oil has demonstrated potential in the treatment of vitiligo and hypopigmentation issues, among other conditions. Extraordinary research indicates that *N. sativa* can spread melanin throughout the skin. By improving the sensitivity of cholinergic receptors in reptile exocrine melanopsin, this preparation aims to thicken melanin. This study examined skin pigmentation with thymoquinone and *N. sativa* oil. Many infections, including vitiligo, a hypopigmentation condition that causes many mental issues in most people, can be effectively treated with *N. sativa* seed oil. This has been examined in some studies. Fish oil and lucerne oil have been used as medicines by analysts. There are excellent outcomes in terms of pain reduction. Decide to add clover oil to the vital treatment



after that. According to one study, *N. sativa* can disseminate melanin throughout the skin. This can be explained by the fact that it increases the lizard's use of melanin by stimulating cholinergic receptors other than melanopsin. This study made them think of using thymoquinone, which is present in *N. sativa* oil, to treat exterior problems including vitiligo and skin hypopigmentation.[27-28]

#### **Sun protection:**

In vitro, lucerne oil has been tested for SPF. It was discovered that the sunscreen with 0.5% *N. sativa* oil had a Super Boots star rating of two and an SPF value of 1.05. It is said to have genuine sunscreen properties. Because of its fragrant qualities, *Nigella sativa* seeds were suggested to be used in cosmetics in 2000. subsequently discovered that lucerne seed oil has some sun protection because its sun protection factor (SPF) is greater than 2. This implies that the oil can be used in cosmetics.[29]

#### **Psoriasis:**

An autoimmune skin disorder that is hyperproliferative and can be challenging and uncomfortable is psoriasis. The purpose of the study was to determine whether ethanolic extract from *Nigella sativa* seeds might be used to treat psoriasis. It was discovered that *N. sativa* thickened the epidermis in comparison to the control group, which was given traditional therapies.[30]

#### **Acne vulgaris:**

One of the most well-known disorder is acne vulgaris. The advantages of dark cumin oil for acne vulgaris have been studied by numerous researchers. Hadi and Ashor (2010) claim that 20% *Nigella sativa* oil extract in

moisturisers is a safer and more effective alternative to 5% benzoyl peroxide lotion, which is a mild treatment for acne.[31] Traditionally, *N. sativa* seeds have been used as salves to treat a range of skin ailments. Bhalani and Shah compared the antibacterial properties of *N. sativa* oil to those of the well-known medication amoxicillin. For both medications, the zone of restraint was comparable. In their most recent study, they combined oil with Carbopol 940 to create a gel, which they then used to treat acne vulgaris with remarkable results. As a result, *N. sativa* is a fantastic option for treating psoriasis, dermatitis, pruritus, skin breakouts, and diseases that cause skin problems.[32]

#### **Hair loss:**

Telogen effluvium is a disorder when hair rashly enters the telogen phase, resulting in hair loss or decreasing. Thymoquinone (TQ), the main compound in *N. sativa* seeds, has anti-inflammatory and antioxidant qualities by inhibiting the activity of proinflammatory mediators such prostaglandin D2 and cyclooxygenase. Twenty telogen effluvium patients were selected for a double-blind, randomised, placebo-controlled investigation. For three months, 10 patients received daily treatments with a topical cream containing 0.5% *N. sativa*, whereas the remaining ten patients had daily treatments with a fake medication. Videodermoscopy was used to assess healing, and three dermatologists conducted surveys prior to, three months following, and six months following therapy.[33]

#### **ADVERSE EFFECTS:**

Many toxicological studies have been conducted on *Nigella sativa* seeds. When lucerne oil was given to mice

through the stomach during the investigation, no harmful effects were seen. In any case, contact dermatitis happens after using homemade beauty products, and the high concentrations of linoleic acid and other unsaturated fatty acids in *N. sativa* oil speed up the absorption of the medication via the skin in vitro. However, this can be because black seed oil contains contaminants. Black cumin seeds can be regarded as safe because studies on animals in research facilities have shown that the severe and chronic toxicity of black cumin components (seed oil and thymoquinone) has little to no toxicity.[34]

### 3. CONCLUSION:

Black cumin, or *Nigella sativa*, has long been valued for its therapeutic and cosmetic benefits in many cultures. This review demonstrates the vast potential of this plant, from its wide range and flexibility of cultivation to its rich phytoconstituents, including thymoquinones, alkaloids and essential oils. These bioactive substances contribute to the many uses of *Nigella sativa* in cosmetics, where it is particularly valued for its resistance, antioxidant and skin-cooling properties. However, the safety of *Nigella sativa* should be considered, especially when taken in excessive amounts, as some toxic substances have been recorded. Given its popularity in both traditional and modern applications, there are many formulations containing *Nigella sativa* on the market. Furthermore, given the cultural importance and benefits of the plant, home treatments using black cumin are still a popular practice. It has great potential in the cosmetic sector. Continued research and responsible use are crucial to ensuring

that *Nigella sativa* remains a cornerstone of culture and health, maximizing its benefits while minimizing risks.

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#### Acknowledgement:

The authors gratefully acknowledge their families for their love and support and also Mahatma Gandhi Vidyamandir's Pharmacy College, Panchavati, Nashik, Maharashtra, India, for providing laboratory facilities, constant support, and encouragement to carry out this work.

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