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Nigella's (*Nigella sativa* L.) Medical Usage and Economic Dimensions in Turkey

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ABSTRACT

The use of plants in treatment begins in very old times. As in all countries of the world, medicinally important plants in our country have been used among the people for centuries. For this purpose, many plant microbiological, pharmacological aspects, even in recent years where biological warfare is on the agenda in terms of plant defense mechanism has been investigated in many ways. At the beginning of the black seed plant; studies have shown that thymokinone has the effect of stopping cell proliferation in many cancer types. Anti-diabetic, anti-oxidant, anti-inflammatory, anti-histaminic, anti-microbial, anti-tumor, hematologic and immunomodulatory effects of *Nigella sativa* have been tried to be elucidated by various studies. Toxic effects on the liver Increase the concentration of ALT in serum. They found a significant increase in serum GGT and ALT concentrations in rats after treatment with *Nigella sativa* extract without visible pathological changes. Black seed; It slows down breast and prostate cancer and protects against lung cancer. Lowers blood sugar. It dilutes the blood. Reduces the risk of heart infarction. Relieves the pain of rheumatism. It dilutes the blood. Reduces the risk of heart infarction. Relieves the pain of rheumatism. It is known to treat cough and respiratory diseases. Accelerates the regeneration of cells. It is anti-inflammatory and diuretic. It has therapeutic properties for skin diseases. It has antioxidant properties. Helps to lose weight. Facilitates digestion. Protects against germs and viruses. It is a treatment for depression and panic attacks. The effect of black seed varies from person to person. Black seed is usually safe when taken in small amounts and is not harmful. Black seed, which is used in the form of spices in foods and pastries such as bread, has no harm. One of the reasons why the people use black seed in our country is “It's a panacea other than death” His belief also has a significant impact.

Keywords: *Nigella sativa*, Nigella, Ethnobotany, Economy, Turkey

INTRODUCTION

One of the major crops grown in Turkey *Nigella sativa*, also known by the name *Nigella* (ect. Nigella’s, Cumin) *N. sativa* is a plant that has received interest in the past as well as today. A sample of black seed found among the grave finds of Tutankhamen gives an idea that it has been used since ancient times. There are also clues that it is used by Cleopatra for its healing and beautifying effects. It was used by Dioscorides for its pain relief and antihelmentic properties, and Hippocrates for the treatment of liver diseases and digestive system complaints. Ibn Sina's El Kanun fit-Medicine in the work of black seed metabolism stimulating, fatigue-relieving drowsiness effect is emphasized. The oldest source of black seed, which is mentioned in religious discourses, is the Old Testament. It was noted that *Nigella sativa* was prescribed by ancient Egyptian and Greek physicians to treat headache, nasal congestion, toothache and intestinal worms as well as menstruation regulator and milk enhancer.

In Turkey, there are three types of *Nigella* breed and widely known in the world. In addition to the cultivation of *N. sativa*, which is our subject, *N. damascena* and *N. arvensis* are the most common species in our country. *Nigella sativa* plant 15 -30 cm. and branched. The leaf is narrow, oblang-lanseolate and very short. The flowers are involucrum free, light blue and actinomorphic. Sepals are whitish, ovate and short nail, petals lower lip ovate, lobed, short-stemmed and acuminate. The carpels are united at the top, lumpy, hard as long as the stylus and hard capsule. The fruit is a capsule formed by partially joining 5 follicles. Seeds are black and have three surfaces and 2-3 mm. When rubbed between the fingers, it gives an odor that resembles fennel and anise (Fig. 1, 2).

The importance of black seed which has been used as a natural medicine in the Middle East and Far East for more than 2000 years for Muslims It comes from the sacred expressions sung by Muhammad. The belief that the seed is a cure for all diseases except death. People in the Persian Gulf region, especially in Saudi Arabia, have strong beliefs about this plant and consume it a lot.

Despite many eye-catching developments in modern medicine, traditional folkloric medicine still continues. The method of modern medicine is scientific and uses technology in its applications. Folkloric medicine (folk medicine), on the other hand, is a cultural heritage that has existed for ages without claiming to be a basic idea and an alternative to contemporary scientific medicine. In folkloric medicine, which adopts supervisory observations as a method, the use of technology is at the lowest level and applications are quite economical.

Figure 1. General apperences of *Nigella sativa* flower

Figure 2. General apperences of *Nigella sativa* fruit

The reason why citizens in our country want black seed from spices is that it is used in many ways in accordance with the hadith among the people, her It is a panacea other than death. Previously, cheese, yogurt, butter and bread is added to a way consumed by turning into a powdered cough, asthma, bronchitis in various respiratory disorders such as honey mixed with eaten. Diabetics swallow with powdered water to lower blood sugar. Oil is used as degasser in children. It is used to reduce tissue damage after treatment of cancer patients receiving radiotherapy, and is also widely used as an adjunct to relieving joint pain.

RESULTS AND DISCUSSION

Nigella's (Cumin) belongs to the family Ranunculaceae. The part used as a nutrient is the seed of this plant formed in capsules. Other names used in our country for Nigella sativa: Black seed, black seed, black seed and black cumin. Black seed seeds contain essential oil (0.38-0.49%), fixed oil (30-40%), protein (20-30%), saponin, melantine, nigellin and tannin.

Scientific classification of Nigella's (Cumin) (In Turkish: Çörekotu)
Regnum: Plantae
Divisio: Angiospermae
Classis: Magnoliopsida
Ordo: Ranales
Family: Ranunculaceae
Genus: Nigella
Species: Nigella sativa L.

Morphology: It is a one-year plant and its plant height varies between 20-50 cm. Stems erect, hairy, branched, sparsely structured herbaceous plant. The leaves are made of 3-piece, with an alternating shape. The flowers are long-stalked and are found at the end of the branches. Blooms in June and July. The flowers are white or light blue in color and have a yellowish green tip. The fruit is in the form of a capsule carrying many seeds. Seeds are the most important part of the plant used, oval-shaped, three-rooted, up to 3 mm long grains (Fig. 3). Harvest time is carried out when the capsules are dark brown (from August to September). Although the yield varies depending on climatic conditions, agricultural technique and soil structure, it is stated that the average is between 170-240 kg seed/decare.

Method of obtaining oil: Black seed oil is obtained from black seed seeds by cold pressing method. Cold press oils are vegetable oils that are produced without mechanical application and without disturbing the nature of the oil (fig. 4).

Figure 3. General apperences of *Nigella sativa* seed

Figure 4. General apperences of *Nigella sativa* oil

Since the oils produced by cold press technique are not exposed to high temperature values during the process, trans fatty acids cannot be formed and the bioactive compounds are not damaged. This situation is extremely important both in terms of health and nutritional value in foods. Cold press technique; is one of the techniques used to produce the highest quality vegetable oils. Oils obtained by cold press method in higher proportions.

Since they contain some substances such as antioxidants, phenolic compounds, phosphatides, carotenoids and phytosterols, their health benefits come to the forefront.

Compounds carried: *Nigella sativa* seeds contain 32-40% fixed oil. This oil is unsaturated and rich in essential fatty acids. Chemical characteristics of total lipids and fatty acid profile revealed that linoleic acid was the most important unsaturated fatty acid followed by oleic acid. It is also rich in fixed fat β-sitosterol. Chemical analysis of fixed oil; the oil 85% of them were unsaturated fatty acids. Black seed seeds; essential oil (thymokinone (TQ), thymohydroquinone (THQ), dithiokinone (nigellon), thymol, carvacrol, α and β-pinene, d-limonene, dsitronellol, p-simene) and also contains bitter substances.

Fatty acids composition of Nigella sativa oil:
C16: 0 Palmitic acid 11-19%
C16: 1 Palmitoleic acid 0.05-0.5%
C18: 0 Stearic acid 2-5%
C18: 1 Oleic acid 17-26%
C18: 2 Linoleic acid 47-67%
C18: 3 Linolenic acid 0.1-1%
C20: 2 Eicosadienoic acid 0-3%

General internal use: Has proven effects in the treatment of respiratory diseases such as asthma and bronchitis. Nigella's oil can be taken 5 ml 3 times a day in adults. The dose between 4-12 years is 2.5 ml 3 times a day and 2-4 years is 1 ml 3 times a day. Dried black seeds are recommended to be taken orally up to 500 mg-1 g three times a day to maintain health and strengthen immunity. Nigella seeds more than 25 grams per day quantities should not be used.

General external use: It is used by rubbing the diseased area in eczema and skin diseases. Wait for at least one hour. It is then washed with soap and rinsed. To prevent hair loss and dandruff head is used. According to the amount of hair, 1 or 2 tablespoons black seed oil is used in a sufficient amount to the bottom of the hair (1 tablespoon is about 10 ml). Begin by massaging the bottom of the hair is fed black seed oil. Cover the hair with the help of a bath for 1 night and then proceed to normal washing. Recommended 2-3 times per week

The main active ingredient in Nigella sativa: Thymokinone

Thymokinone (C10H10O2; 2-isopropyl-5-methyl-1,4-benzoquinone (molecular weight 164.2) is the main bioactive component of the essential oil of Nigella essential oil. Studies have shown that thymokinone has the effect of inhibiting cell proliferation in many cancer types. Types of cancer in which thymokinone is effective; breast adenocarcinoma, ovarian adenocarcinoma, colorectal cancer, human pancreatic adenocarcinoma, uterine sarcoma, neoplastic keratinocyte, human osteosarcoma, fibrosarcoma, lung sarcoma. It has also been reported that thymokinone inhibits hormone-refractory (unresponsive) prostate cancer by targeting the androgen receptor and transcription factor E2F-1.

Pharmaceutical effects of *Nigella sativa*

The anti-diabetic, antioxidant, anti-inflammatory, antihistaminic, anti-microbial, anti-tumor, hematological and immunomodulatory effects of Nigella sativa were determined. Some studies have shown a significant decrease in plasma glucose concentrations and a significant increase in insulin levels in thymokinone-treated diabetic mice.

Anti-Oxidant Effects of *Nigella sativa*

When the findings obtained from in vivo studies in recent years are combined, it is seen that Nigella sativa oil shows anti-toxic activity due to its anti-oxidant properties.

Anti-Inflammatory Effects of *Nigella sativa*

The components of Nigella sativa oil have been shown to have anti-inflammatory effects in some inflammatory diseases such as Experimental Autoimmune Encephalomyelitis (EAE) and colitis.

Anti-Histaminic Effects of *Nigella sativa*

Some preclinical and clinical studies have shown anti-histaminic effects of dae *Nigella sativa* seeds. In the studies, it was observed that different active ingredients contained in *Nigella sativa* oil have different effects on histamine release. The active ingredient Nigellone (dithymokinone) of the crude extract of *Nigella sativa* acts as a calcium channel blocker and, depending on this effect, *Nigella sativa* has been used as a conventional therapeutic for diarrhea, asthma and hypertension.

Anti-Microbial Effects of *Nigella sativa*

Nigella sativa oil and its active components are known to have anti-microbial properties, including anti-bacterial, anti-fungal, anti-helminitic and anti-viral. In addition to its anti-viral and anti-helminitic effects, Nigella sativa oil, *Escherichia coli, Bacillus subtilis, Streptococcus faecalis, Staphylococcus aureus, Pseudomonas aeruginosa* and antibacterial against many pathogenic yeast *Candida albicans* and some fungus.

Anti-Tumor Effects of *Nigella sativa*

Numerous in vivo and in vitro studies have shown that *Nigella sativa* seeds and their active components have anti-tumor effects. The effects of essential oil of *Nigella sativa* seeds were investigated on different cancers in humans and were found to show cytotoxic effects against some of the oil. In addition to the anti-tumor effects of the crude extract of *Nigella sativa*, thymokinone, dithiokinone and other active components also have cytotoxic effects.

Hematological Effects of *Nigella sativa*

Nigella sativa oil has been found to have a high inhibitory effect on blood clotting. Subsequently, it was found that the methanol-soluble part of *Nigella sativa* oil had higher inhibition effect on blood coagulation and platelet aggregation than other parts.

Immunomodulator Effects of *Nigella sativa*

When the findings are evaluated, it can be concluded that the cellular immune-stimulating effect of *Nigella sativa* depends on the nature of the immune response. On the other hand, in vivo studies have also shown the triggering effects of *Nigella sativa* oil on T cell immunity.

Potential Toxicity of *Nigella sativa*

However, higher doses of thymokinone will increase oxidative stress leading to hepatic damage. Further studies should focus more on the possible toxic effects of *Nigella sativa* oil, its extracts and even its active ingredients. New studies should be conducted on different animal species with different doses, different routes of administration and duration of administration.

Benefits of *Nigella sativa*

* Nigella, breast and prostate cancer slows down, is a protective against lung cancer.
* Lowers blood sugar.
* Dilutes the blood.
* Reduces the risk of heart infarction.
* Relieves the pain of rheumatism.
* It is known to treat cough and respiratory diseases.
* Accelerates the renewal of cells.
* Anti-inflammation and diuretic.
* It has the feature of curing skin diseases.
* Has antioxidant properties.
* Helps to lose weight.
* Facilitates digestion.
* Protects against germs and viruses.
* It is a treatment for depression and panic attacks.

What are the damages of *Nigella sativa*?

Nigella sativa seeds are black in color and contain essential oils, alkaloids, saponins and tannins. The bitter black seed oil means it's spoiled. The effect of black seed varies from person to person. Black seed is usually safe when taken in small amounts and is not harmful. Black seed, which is used in the form of spices in foods and pastries such as bread, has no harm.

Economic Dimension of *Nigella sativa*

According to data from 2018 *Nigella sativa* is about 4,000 tons of annual production in Turkey. The distribution of annual production by provinces is as follows; Burdur (1.000 tons), Konya (650 tons), Uşak (600 tons), Çorum (250 tons), Kütahya (150 tons), Antalya (150 tons), Bursa 150 (tons), Ankara (100 tons), Samsun (100 tons) and Sivas (100 tons) (Table 1)

Table 1. The distribution of *Nigella sativa* production in Turkey by province (According to data from 2018)

Province	**Annual Production (tons)**
Burdur	1.000
Konya	650
Uşak	600
Kütahya	250
Antalya	150
Bursa	150
Ankara	100
Samsun	100
Sivas	100
Others	900
Total	**4000**

Nigella sativa price is about 10 liras per kilogram in Turkey. Total annual revenue is approximately 40,000,000 Turkish Liras of *Nigella sativa* farmers in Turkey. *Nigella sativa* agriculture in Turkey is moving towards becoming a hope for farmers.

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