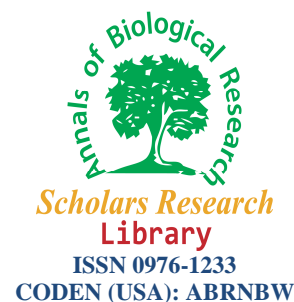




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## The study of pharmacologic and medicinal valuation of thymoquinone of oil of *Nigella sativa* in the treatment of diseases

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### ABSTRACT

*Nigella sativa* is an annual plant which belongs to southwest Asia. It grows up to 20-30cm, with divided and linear (not thread-like) leaves. Its flowers are delicate, and usually pale blue and white, with 5-10 petals. The fruit is a large and inflated capsule composed of 3-7 follicles and each contains numerous seeds. The seed is used as a spice. *Ns* has been used in medicinal purposes for centuries as a herb and sometimes as oil, in Asia, Middle East, and Africa in order to treat ailments including asthma, bronchitis, rheumatism and related inflammatory diseases, increasing milk production in nursing mothers, promoting digestion and fighting parasitic infections, health, stomach and intestinal health, kidney and liver functions, circulatory and immune system support, as analgesic, anti-inflammatory, ant allergic, antioxidants, anticancer, antiviral and for general well-being. Its oil has been used in order to treat skin conditions such as eczema and boils and cold symptoms. Medicinal plants widely are used in traditional medicine in order to avoid major effects caused by chemical drugs. The black seeds of *Ns* contain non-volatile (30%>) and volatile oil (45-40%). And thymoquinone is the main component of this oil. In different countries the black seed is used in traditional medicine in order to treat diseases such as hypertension, blood pressure, fat diseases, reduction asthma and diarrhea, rheumatism and infectious diseases against nematodes and cestodes (tape worms), anti-malaria, tumors and cancers disinfectant. This article reviews the pharmacology of the oil of *TQ* of *Ns* in treating diseases.

**Key Words:** *Nigella sativa*, thymoquinon, treatment, biological activity.

### INTRODUCTION

*Nigella sativa*<sup>1</sup> is an annual flowering plant, native to southwest Asia. It grows to 20-30 cm tall, with divided, linear (but not thread-like) leaves. The flowers are delicate, and usually colored pale blue and white, with 5-10 petals. The fruit is a large and inflated capsule composed of 3-7 united follicles, each containing numerous seeds. The seed is used as a spice.

*Ns* has been used for medicinal purposes for centuries, both as a herb and pressed into oil, in Asia, Middle East, and Africa to treat ailments including asthma, bronchitis, rheumatism and related inflammatory diseases, to increase milk production in nursing mothers, to promote digestion and to fight parasitic infections, health, stomach and intestinal health, kidney and liver function, circulatory and immune system support, as analgesic, anti-inflammatory, ant allergic, antioxidants, anticancer, antiviral and for general well-being. Its oil has been used to treat skin conditions such as eczema and boils and to treat cold symptoms. [20, 25]

<sup>1</sup> *Ns*

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**DISCUSSION****2.1. Benefits of black seed oil<sup>2</sup> and its compounds**

Seeds contain volatile and non-volatile oil, proteins, alkaloids and saponin (soapy compounds). Most of the biological activity of grains depends on the main component of volatile oil, and some non-volatile oil is called Thymoquinone<sup>3</sup>. The volatile oil of Ns has Opiate Detoxification activity and strong antiviral effect against Murin cytomegalovirus<sup>4</sup>. Black seed oil protected the cells against viral infections so by Ns s' treatment no liver and spleen infection will be observed. [3]

Traditional use of Ns and its derivatives in the treatment of rheumatism and related infectious diseases is also shown. [2]

Seeds and oil of Ns have anti-inflammatory, antitumor, antimicrobial, and anti-malarial, pain relief and antipyretic characteristics. [1, 2, 3, 4, 10, 15, 16, 17, 24]

Nigellon is the carbonyl polymer of TQ and has a medicinal property that includes antimicrobial, antitumor, antiviral, anti-inflammatory, reduction blood sugar, muscle relaxation and ant oxidation. [26]

**2.2. Effect on blood pressure and homeostasis**

Treating Rats with seeds during 12 weeks, shows changes in their blood as follows: [18]

1. Increasing in the volume of filled cells and hemoglobin (as a result of increasing in the level of hematocrit).
2. Reduction in plasma cholesterol concentration, triglyceride and glucose, and decrease platelet and leucocyte.

Therefore Ns oil reduces blood pressure, but the plant also shows relative toxicity.

In another research the dichloromethane that is taken from Ns seeds was used and treating Rats with the extract has results as follow:

1. Urine Increased about 16-30 percent
2. BP decreased about 18-22 percent.

Results of these researches approve the traditional uses of Ns seeds in the treatment of increased blood sugar and abnormal blood lipid levels and related disorders. [18]

**2.2.2. NS effect on asthma**

Ns extract was used in asthma treatment. Ns by coronary ligation-mediated calcium channels inhibits the contraction, causes relaxes the smooth muscles of the trachea. In traditional medicine the Ns with honey is used to treat asthma. [20, 25]

**2.3. How NS function in cancer treatment (using ns in modern medicine)**

Ns increases cell immune responses from T and B cells and activate macrophages, also natural killer<sup>5</sup> cell activity increases as well. Ability of natural killer cells to kill tumor cells without previous special Sensitive possesses .

Ns volatile oil<sup>6</sup> is a powerful factor in reducing the serum antibody titer. Also it causes decreasing number of Neutrophils and Splenocytes to significantly reduce .

TQ that isolated from Ns was tested on number of human cancer cells. Information received states that Ns oil can be the toxins cell that antibody production is deterrence. [10, 21]

**2.4. Using the ns in cancer treatment**

In an experiment the properties of raw gum, solid oil and two refined compounds of Ns seeds (TQ and D-thymokinone) was studied<sup>7</sup>. Results showed that TQ & DIM have toxins effects on cancer cells and destroyed them. [7, 10]

**2.5. NS THERAPEUTIC EFFECTS AGAINST CARCINOGENS:** TQ antitumor potential effect on fibro sarcoma (20-methylcholanthrene) has been studied. The tested rats after receiving 20-methylcholanthrene for a week

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<sup>2</sup> black seed oil(BSO),

<sup>3</sup> TQ

<sup>4</sup> MCMV

<sup>5</sup> NK

<sup>6</sup> NSVO

<sup>7</sup> DIM

were cured with TQ. The results showed that the prevalence and spread of tumors and its weights reduced about 34-43%. [7]

### **2.6. Evaluation of chemical drugs and thymoquinine on the diseases (26)**

Doxorubicin<sup>8</sup> is a powerful substance in cancer chemotherapy that effects on wide range of malignancies. Intravenous injection DOX causes the severe renal syndrome, which is associated with reduces albumin and protein of blood and increasing in blood lipids and serum urea and also large of urinary excretion proteins including albumin and N-acetyl D-β Glucose amid<sup>9</sup>.

Volatile oil contains TQ (18.4-24%) and several Monoterpene like α-Pinene and p-cymene.

Using TQ has the following effects :

1. decreasing urea of serum and (TG and TC)
2. stopping Urinary excretion of NAG
3. inhibition of urinary albumin and protein

So the complications caused by DOX were inhibited by TQ .

### **2.7. NS affect on renal disease**

TQ, the main components of Ns oil treats the variety of renal diseases. In the other words, protects kidney cells against substances that toxic effects .

Protective role of TQ against DOX that stimulus Nephrosis (kidney disease) in rats witch happens by the action of antioxidants.

TQ ability in inhibiting protein production can obviously increase blood cholesterol .

### **2.8. NS effects on liver side effects [22]**

TQ affects on isolated liver cells of rats has done and the results are as follow:

1. Rapid decline of cell biological features
2. Quick finish in intracellular glutathione
3. Increasing in intracellular enzymes secretion

Ns oil has totally protective and therapeutic effects against D-galactose amine, carbon tetrachloride<sup>10</sup> [19], but its protection against carbon tetrachloride is relative. [14]

Also Ns can avoid fibrosis and cirrhosis of the liver in rabbits. [11, 13]

### **2.9. NS effects on the treatment of gastric cancer [11]**

TQ inhibit the fore stomach tumor incidence ago that created with BP and also relatively might decrease proliferation 67-70%. Practical methods of using TQ are the ant oxidation activities and these activities are associated with increased Opiate Detoxification processes. [9]

TQ has protective role against gastric ulcers and its function is relative to keep the oxidation - reduction balanced of with gastric mucosa. In addition Ns oil prevents the stomach ulcers with increasing of mucin and glutathione. [6]

### **2.10. NS effect on cancer colon (21)**

TQ with stopping (G1) inhibits the growth of cancer cells and is used in order to treat colon cancer .

### **2.11. NS effect on leukemia**

α-hydrin, namely saponin pantacycline that has been separated from Ns seeds. This combination is Ns autonomic extract that exist in the No. 5 column chromatography of ethyl-acetate. (Section 5 column chromatography or CC-5)

Effect of CC-5 was examined on cancer cells such as leukemia cells, P388 and LL12 cells in rats. α-hydrin hydria is strongest soapy isolated (separated) from CC-5 which has antitumor performance .[8, 18]

<sup>8</sup> DOX

<sup>9</sup> NAG

<sup>10</sup> CCLA

### 2.12. NS affect apoptosis

In a test, Hep-2 cells exposed with LPS and Cortisol lonely (separately) and in combination with each other. Results showed that cells in different volumes had become apoptosis. Then the cells were under Ns and Ns prevented from apoptosis in these cells .

### 2.13. NS effect on diabetes

The oral treatment of Hamsters by Ns oil started after 4 weeks. These Hamsters under test stricken to diabetes with consume the nicotine amide and streptokinase. These Hamsters cured with Ns oil so blood sugar decreased and insulin levels increased. The result proves the Insulin tropic characteristic of Ns in diabetes type 2 .[5, 9, 23]

### 2.14. Effect on pregnancy rates

Hexane extract of Ns seeds prevents from fertilization of rats and also causes non-pregnant. Pregnancy doses only inhibited mild uterine nutritional activity is. [12, 16, 23]

Effects on Echosoioied (unsaturated fats) and blood coagulation [6] are other features of Ns oil.

### 2.15. NS disadvantages

Volatile oils can make skin inflammation because Ns oil is stimulus of skin sensitivity so the extracted volatile oil from the seeds has other effects. Clearly who were using the volatile oil of Ns ointment had skin suffered including blisters pimples with small scattered (are named boiling pussy), intense itching, skin irritation and skin [2] .

### Acknowledgments

This study was supported by the research council of Young Researchers Club, Science and Research Branch, Islamic Azad University, Tehran, Iran.

### REFERENCES

- [1] Abdulelah, H.A.A. and Zainal-Abidin, B. A. H. *American Journal of Pharmacology and Toxicology* 2 (2): 46-50, **2007**
- [2] Al-Ghamdi MS. *J Ethnopharmacol* 76: 45-48, **2001**.
- [3] Amein Al-Ali, Abdul Aziz Alkhawajah, Mohammad Akram Randhawa, Nisar Ahmed Shaikh. *Oral and Intraperitoneal Ld50 of Thymoquinone, an Active Principle of Nigella Sativa, In Mice and Rats*. J Ayub Med Coll Abbottabad **2008**: 20(2).
- [4] Anwar MARAQA, Najwa F. AL-SHARO'A, Husni FARAH, Wafa M. ELBJEIRAMI, Ashok K. SHAKYA, Abdul-Karim J. SALLAL. *Turk J Biol* 31 (**2007**) 155-159.
- [5] Ayed Sh. AL-LOGMANI and Talal A. ZARI. *Effects of Nigella Sativa L. And Cinnamomum Zeylanicum Blume Oils On Some Physiological Parameters In Streptozotocin-Induced Diabetic Rats*. Boletín Latinoamericano y del Caribe de Plantas Medicinales y Aromáticas, 8 (2), 86 - 96. **2009**.
- [6] Camilia G. Michel, Demiana I. Nesseem, Nesrine S. El-Sayed, Taha S. El-Alfy1. *J. Chem. Pharm. Res.*, **2011**, 3(2): 213-225
- [7] Gowhar Shafi, Anjana Munshi, Tarique N. Hasan, Ali A. Alshatwi, Jyothy A., David K. Y. Lei. *Cancer Cell International or any BioMed Central. journal*. **2009**, 9: 29.
- [8] Harami, M. Adamu, E.O. Ekanem and Suleiman Bulama. *Pakistan Journal of Nutrition* 9 (10): 966-967, **2010**.
- [9] Ibrahim, O. Farah, A. *Int. J. Environ. Res. Public Health* **2005**, 2(3), 411-419
- [10] L. Ait Mbarek1, H. Ait Mouse1, N. Elabbadi,M. Bensalah1, A. Gamouh,R. Aboufatima,A. Benharref, A. Chait,M. Kamal, A. Dalaland A. Zyad1. *Brazilian Journal of Medical and Biological Research* **2007** Online Ahead of Print
- [11] Mastour S. Al-Ghamdi. *The American Journal of Chinese Medicine*, Vol. 31, No. 5, 721–728, **2003**.
- [12] Matira Khanam & Zesmin Fauzia Dewan. *Bangladesh J Pharmacol* **2008**; 4: 17-20
- [13] M. A. Mansour, O. T. Ginawi, T. El-Hadiyah, A. S. El-Khatib, O. A. Al-Shabanah, H. A. Al-Sawaf. *Res. Commun. Mol. Pathol. Pharmacol* 110: (3&4); 239-251, **2001**
- [14] Mehmet Kanter, Omer Coskun, Mustafa Budancamanak. *World J Gastroenterol* **2005**; 11(42): 6684-6688.
- [15] Morsi NM. *Acta Microbiol Pol* 49: 63-74, **2000**.
- [16] Mukhallad A Mohammad, Mohamad MJ Mohamad and Hatham Dradka. *Research Journal of Medicine and Medical Sciences*, 4(2): 386-390, **2009**, INSInet Publication
- [17] Nagi A. Alhaj, Mariana N. Shamsudin, Hana F. Zamri and Rasedee Abdullah. *American Journal of Pharmacology and Toxicology* 3 (4): 225-228, **2008**
- [18] Nagi A. ALHaj, Mariana. N. Shamsudin, Norfarrah. M. Alipiah,Hana F. Zamri, Ahmad Bustamam, Siddig Ibrahim and Rasedee Abdullah. *American Journal of Pharmacology and Toxicology* 5 (1): 52-57, **2010**

- [19] Nevin İlhan, Dilara Seçkin. *Protective Effect of Nigella Sativa Seeds on Ccl4-Induced Hepatotoxicity*. F.Ü. Sağlık Bil. Dergisi **2005**, 19(3), 175-179
- [20] Shafizade, F. **2002**. *Medicinal Plants of Lorestan*. Tehran: Hayyan publisher.
- [21] S. Ivankovic, R. Stojkovic<sup>1</sup>, M. Jukic, M. Milos. *Experimental Oncology*. 28, 220–224, **2006**.
- [22] Turkdogan M, Agaoglu Z, Yener Z et al. *The Role Of Antioxidant Vitamins, Selenium And Nigella Sativa In The Prevention Of Liver Fibrosis And Cirrhosis In Rabbits*: new hopes. Dtsch Tierarztl Wochenschr 108: 71-73, **2001**.
- [23] Yu. I. Oshchepkova, E. A. Rogozhin, O. N. Veshkurova, Ts. A. Egorov, Sh. I. Salikhov, and E. V. Grishin. *Chemistry of Natural Compounds*, Vol. 45, No. 5, **2009**
- [24] Zargari, Ali. 1992. *Medicinal Plants*. Tehran: university of Tehran publisher.
- [25] Zubaida A. Hawsawi, MBBS; Basil A. Ali, PhD; Abdullah O. Bamosa, PhD. *Annals of Saudi Medicine*, Vol 21, Nos 3-4, **2001**.