Importance of *Nigella sativa* in Radiotherapy or Chemotherapy

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Author’s contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

The present study aims to evaluate the beneficiary effect of *Nigella sativa* in radiotherapy or chemotherapy. Cancer is one of the biggest threats of modern life, which is accepted as the second cause of death after myocardial infarction. Current chemotherapy, radiotherapy, surgery, etc. cannot provide complete treatment for cancer cases that cannot be diagnosed early. *Nigella sativa* has been used in the treatment of various diseases in traditional medicine for over 2000 years, since it is a natural medicinal medicine as well as a spice in the kitchen. The inadequacy of existing treatments encourages scientists to find alternative and more effective treatment methods. Many studies have important effects such as antibacterial, antifungal, antihelminthic, antioxidant, anti-diabetic, anti-inflammatory, analgesic, gastroprotective, hepatoprotective, renoprotective, anti-convulsant, antiasthma. As a result, *Nigella sativa* is used in *in-vivo* and *in-vitro* studies in cancer treatment by utilizing its beneficial and protective effects on many systems and it is known that it does not harm healthy cells. Although scientific studies are conducted, the current number of studies is limited. There is a need for clinical studies to show a possible positive effect on the current types of cancer.

Keywords: Radiotherapy; chemotherapy; *Nigella sativa*.

1. INTRODUCTION

Cancer is one of the biggest threats of modern life, which is accepted as the second cause of death after myocardial infarction. Current chemotherapy, radiotherapy, surgery, etc. cannot provide complete treatment for cancer cases that cannot be diagnosed early. Tumors that cannot be completely destroyed can be repeated within five years. The inadequacy of existing treatments encourages scientists to find alternative and more effective treatment methods. One of these treatments has been developed in this way in targeted therapies. How effective these treatments are, however, is not yet known and is the subject of research. In target oriented therapies, the search for alternative treatment continues because of damage to healthy cells. Another alternative treatment is the herbs that do not harm the healthy cell. Many side effects of
drugs used in cancer treatment have increased interest in natural plants. One of the herbs called NS medicinal plants ‘in traditional treatment is Nigella sativa (NS) black cumin or black seed scientific name (NS) [1-7].

2. MATERIALS AND METHODS

2.1 The Structure of Nigella sativa and Its Role in the Treatment of Diseases

NG has been used in the treatment of various diseases in traditional medicine for over 2000 years, since it is a natural medicinal medicine as well as a spice in the kitchen. The mechanism of action of this plant has not been fully established. The reason for this is that it can treat many diseases and has more than one active substance in its structure. In the structure of NS seeds, there are essential oils, fixed oils, proteins, amino acids, alkaloids, tannins, saponins, fibers, carbohydrates, minerals, ascorbic acid, thiamine, niacin, pyridoxine and folic acid. The fixed oil contains unsaturated (oleic acid, linoleic acid, eicodadienoic, arachidonic acid and linolenic acid) and saturated fatty acids (palmitic acid and myristic acid) while the volatile oil contains d-limonene, nigellone, carvacrol, α and β-pinene. Pharmacologically active components thymokinone (TQ), ditimokinon, thymohydroquinone and thymol were isolated from the essential oil. Many studies have important effects such as antibacterial, antifungal, antihelmintic, antioxidant, antiadiabetic, antiinflammatory, analgesic, gastroprotective, hepatoprotective, renoprotective, anti-convulsant, antiasthma. In addition to this, it has a significant antitumoral, anti-proliferative and cytotoxic effect on cancer which is one of the most important diseases of our age. It also has an important immunomodulatory effect by increasing the levels of NS fat and TQ’s T cells and the killer cells that mediate immune response [1-5]. Many invivo and invitro studies have shown the antitumoral effects of NS seeds and active ingredients (TQ). In vitro studies TQ has been shown to lead cancer cells to apoptosis in tumor cells in many types of cancer, including osteosarcoma, fibrosarcoma, larynx, leukemia, breast, ovary, colorectal, lung and prostate cancer [1,2]. In an in vivo study conducted by Attoub et al. reported that tumor growth was reduced by 39% as a result of the administration of thymokinone for 18 days in rats with lung cancer [6]. Some studies have shown that NG does not harm healthy cells [1-6].

2.2 The Role of Nigella sativa in Chemotherapy and Radiotherapy

Since it is a well-known plant for centuries, NG has been used in combination with chemotherapy and radiotherapy. In a study by Banerjee et al., chemotherapy drugs such as gemcitabine and oxaliplatin, which are used in the treatment of pancreatic cancer, activate NF-KB, which is an important apoptosis pathway, that thymokinone suppresses this pathway. As a result, they stated that thymokinone killed chemotherapy-resistant cancer cells [7]. In another study, cisplatin + thymokinone group in lung cancer mice only evaluated cisplatin group. A reduction in the size of the tumor was observed in the combined treatment up to 79% compared to the control [8]. In addition, it has been found that the effect rate of thymokinone is higher than chemotherapy alone in pancreatic and lung cancer studies where chemotherapy drugs are applied [1-3]. In addition, it has been observed that radiotherapy effect is significantly increased in breast and head and neck tumor cell cultures [3,4]. In the review written by Mostofa et al., TQ was reported to have both radioprotective and radiosensitive effects. The radioprotective effect is mainly provided by free radical cleaning ability and antioxidant properties. It has been emphasized that the radiosensitive effect is achieved by directly acting on the activation of several signal transduction pathways, including PI3K-Akt-mTOR, which provides apoptosis modulation and resistance to radiotherapy [9]. When all these data are evaluated, the fact that NG does not cause a change in normal tissue while taking the neoplastic tissue to apoptosis supports that NG is a potential drug. In this way, the dose of chemotherapy drug or radiotherapy can be reduced and the quality of life can be increased by reducing the side effects that may occur due to treatment. In addition, the treatment of NG with remaining cells resistant to chemotherapy and radiotherapy provides an advantage in the treatment. However, it is not clear how much dose and which types of cancer to use. In the literature, meta-analysis and randomized clinical studies are insufficient.

3. CONCLUSION

As a result, NS is used in in vivo and in vitro studies in cancer treatment by utilizing its beneficial and protective effects on many systems and it is known that it does not harm healthy cells. Although scientific studies are conducted, the current number of studies is
There is a need for clinical studies to show a possible positive effect on the current types of cancer.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES


