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Thymoquinone: The major component responsible for various properties of Nigella sativa

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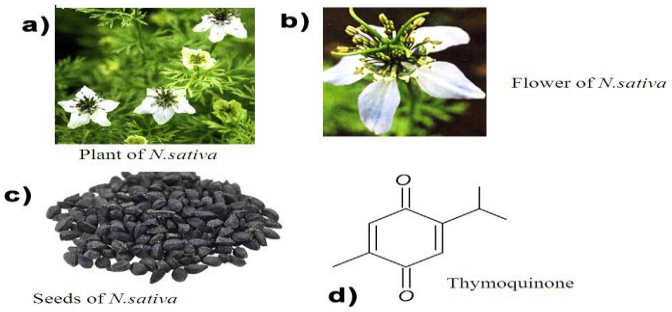
Abstract

Since ancient times plants are used in the welfare of mankind including their use for dietary, culinary, medicinal, and curative purposes. Many of the traditional and alternative medicines rely on the use of medicinal plants for promotion of general health and well-being due to their diverse pharmacological effects. The phytochemicals present in these plants and herbs are responsible for their healing powers. Many classes such as saponins, alkaloids, terpenes, and glycosides present in the herb are considered as phytochemicals. From the family of these quinones, benzoquinone that is represented by thymoquinone. (TQ) has received enormous attention for its pharmacological properties and therapeutic potential [1]. Thymoquinone (TQ) is the most abundant constituent of the volatile oil of *Nigella sativa* seeds and most properties of *N sativa* are mainly attributed to TQ [2]. A number of pharmacological actions of TQ have been investigated including anti-oxidant, anti-inflammatory, immunomodulatory, anti-histaminic, anti-microbial and anti-tumor effects [3]. It has also gastroprotective, hepatoprotective, nephroprotective and neuroprotective activities [4]. In addition, positive effects of TQ in cardiovascular disorders, diabetes, reproductive disorders and respiratory ailments, as well as in the treatment of bone complications as well as fibrosis have been shown [1]. In addition, a large body of data shows that TQ has very low adverse effects and no serious toxicity [5-8].

N. sativa (Fig.1) whose seeds commonly known as black cumin are the main natural source of TQ [9]. Apart from Ranunculaceae family, the presence of TQ in several other genera of the Lamiaceae family including as Agastache, Coridothymus, Monarda, Mosla, Origanum, Satureja, and Thymus were also reported [10-13]. It has also been found in genus Tetraclinis, and in the form of glycoside in the genera Cupressus and Juniperus of the Cupressaceae family. The traces of TQ were also found in Nigella arvensis L. seeds [9]. TQ in many plant species is present in dimeric and reduced forms such as dithymoquinone (DTQ) and thymohydroquinone (TQ), the second being considered as a compound with potential pharmacological activities including anti-bacterial [14], anti-fungal [15], anti-inflammatory, anti-oxidant, and acetyl cholinesterase inhibitory [16]. Studies reported TQ and reveal its therapeutic potential against several diseases including diabetes, neuropathic pain, ulcerative colitis, cancer, cardiac, musculoskeletal, and neurodegenerative illnesses including Alzheimer's and Parkinson's [17]. TQ being a natural constituent in numerous edible plants makes a dietary component since ancient times and considered safe with time tested evidence. The low toxicity of TQ makes it tremendous commercial attention worldwide to be used in foods and gaining acceptance for pharmacological research, therapeutic benefits and pharmaceutical development for human application in coming years. Apart from its medicinal use these days, it has also been used in the food industries like an additive, flavor enhancer and preservative.



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