



A review on toxicological properties of thymoquinone a natural broad spectrum ingredient

F. Farhadi¹, Gh. Karimi², H. Mashayekhi-Sardoo^{2*}, P. Shoaee-Hagh², A. Mashayekhi-Sardoo³

¹Department of Pharmacognosy, School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran.

²Department of Pharmacodynamics and Toxicology, School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran.

³Department of Critical Care Nursing, Jiroft University of Medical Science, Jiroft, Iran.

Background and objectives: *Nigella sativa* is a delicate floral vegetable belonging to Ranunculaceae family. Thymoquinone (TQ) is the dominant active component in *Nigella sativa* seed oil which has a variety of pharmacological properties such as antioxidant, anticancer, anti-inflammatory and analgesic activities. However, TQ is a quinone derivative, which may lead to the generation of reactive oxygen species and resulting intermediate toxicity with various adverse effects in vivo, including acute cytotoxicity, genotoxicity, immunotoxicity, and carcinogenesis. In this review we have mentioned several studies on the toxicity properties of thymoquinone and *Nigella sativa*. **Methods:** A literature search was conducted using the Web of Science, PubMed, MEDLINE and Scopus. The search included the following keywords: "thymoquinone", "hydroquinone", "quinone" and "*Nigella sativa*". Citations within articles were also reviewed to identify the relevant sources. We studied about 170 articles and put aside the articles that were performed on the effect of *Nigella sativa* and thymoquinone on cancer cell lines. **Results:** Since TQ is a quinone derivative, we observed the generation of reactive oxygen species and the toxicity of this substance in some studies. LD₅₀ of Thymoquinone was very higher than *Nigella sativa* and also LD₅₀ of this substance in oral route was higher than intraperitoneal route of administration. **Conclusion:** The findings have provided approximate safety information for TQ, which will further help researchers.

Keywords: hydroquinone, *Nigella sativa*, quinone, thymoquinone
