

*Abstract*

# Protective Roles of Thymoquinone Nanoformulations: Potential Nanonutraceuticals in Human Diseases <sup>†</sup>

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**Abstract:** Nanotechnology has the potential to improve bioavailability and drug delivery for bioactive compounds derived black seed (Thymoquinone, TQ) for the effective management of different human diseases. Therefore, numerous Nanoformulations have been developed improved oral bioavailability of Thymoquinone. The current study gives a review of the applications of Nanomedicine to enhance the biological activities of TQ to control different diseases in several in vivo studies as preliminary investigation for human diseases treatment by Nano-TQ. Nano-TQ effectively augments the anticancer roles of doxorubicin by upregulation of P53, downregulation of Bcl2 and potentiated paclitaxel's apoptosis in MCF-7, breast cancer cell. Moreover, Nano-TQ protects against diabetes, inflammation, CNS, and hepatotoxicity mainly by enhancement of organs' antioxidant status. From the current studies, we can conclude that Nano-TQ is a promising nutraceutical for human health in the prevention and treatment of various disorders.

**Keywords:** nutraceuticals; nano-nutraceuticals; nanoformulation; prevention and treatment