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Editorial Article

# An insight into the therapeutic role of nature's wonder molecule Thymoquinone

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**Abstract**

The bioactive compound Thymoquinone (TQ) from Nigella sativa (NS) has been reported to exhibit anticancer, antidiabetic and antiviral activities. TQ displays cytotoxic effects by selective killing of the HepG2 and SMMC-7721 HCC cells. It can be used effectively to control the blood glucose levels by preventing gluconeogenesis. It is used as a potential hypolipidemic agent on type 2 diabetic patients by supplementing with NS seeds 2g/day dose. Additionally, it shows tremendous antiviral activity against the dreadful coronavirus SARS-CoV-2 by inhibiting the pore-forming activity of envelope protein.

**Keywords:** nigella sativa; black cumin; thymoquinone; natural drug; sars-cov-2

## Introduction and observation

The seeds of Nigella sativa also referred to as black seed or black cumin contain Thymoquinone (TQ) which is a naturally occurring bioactive substance. It has a number of therapeutic benefits and has been utilised in traditional medicine from time immemorial and has attracted attention in recent years. Research suggests that TQ has antioxidant, anti-inflammatory, anti-cancer, and antibacterial properties.

TQ has been investigated for its potential benefits on a variety of medical illnesses. In cancer research it has shown tremendous promise as an anticancer agent by inhibiting the growth of different types of tumour cells and promoting cell death. It has been reported to possess antidiabetic properties by increasing glucose metabolism, enhancing insulin sensitivity and protecting pancreatic beta cells. The NS has demonstrated hypolipidemic effects in animals and humans which exhibit favourable effect on triglycerides and lipoprotein. Additionally, TQ's antimicrobial properties have been demonstrated against various microbes making it a potential natural drug. It is important to note that TQ demonstrated promising results against structural proteins of dreadful SARS-CoV-2 by inhibiting the envelope, spike and membrane proteins. However, more research is needed to fully understand its effects, optimal dosage and side effects.

Jehan et al. investigated the cytotoxic effects of the natural compound TQ separately or in combination with DDP and DOX to HCC cells. TQ showed selective killing of HepG2 (human hepatoma cell line) and SMMC-7721 HCC cells (hepatocelluar carcinoma) but only moderate toxicity to HL-7702 normal liver cells. Interestingly, TQ demonstrated synergistic suppression of HCC cells but not HL-7702 cells when combined with DOX or DDP. Therefore, it is evident from the study that TQ synergistically improves the anti-cancer activity of DOX and DDP.

Heshmati et al. reported that the active ingredient TQ showed positive results in controlling the blood sugar levels. The principle is based on enhancing glucose absorption by increasing the serum concentration, and decreasing high levels of serum glucose, and decreasing blood glucose by inhibiting gluconeogenesis.

Kaatabi et al. administered NS capsules to patients associated with type 2 diabetes with 1, 2, and 3 g/day dose for a period of 12 weeks. The results indicated an increase hypolipidemic effect with 2g/day dose. However, it failed to show any significant impact with 1 and 2g/day dose.

Mohideen demonstrated that Thymoquinone exhibits a high affinity for the SARS-CoV-2 envelope protein (E protein) thereby preventing the viral entry into host cells by inhibiting the pore-forming protein activity of the SARS-CoV-2 E protein ion channel through molecular informatics studies.

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