Immunomodulatory and therapeutic properties of the Nigella sativa L. seed.


Source

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Abstract

A larger number of medicinal plants and their purified constituents have been shown beneficial therapeutic potentials. Seeds of Nigella sativa, a dicotyledon of the Ranunculaceae family, have been employed for thousands of years as a spice and food preservative. The oil and seed constituents, in particular thymoquinine (TQ), have shown potential medicinal properties in traditional medicine. In view of the recent literature, this article lists and discusses different immunomodulatory and immunotherapeutic potentials for the crude oil of N. sativa seeds and its active ingredients. The published findings provide clear evidence that both the oil and its active ingredients, in particular TQ, possess reproducible anti-oxidant effects through enhancing the oxidant scavenger system, which as a consequence lead to antitoxic effects induced by several insults. The oil and TQ have shown also potent anti-inflammatory effects on several inflammation-based models including experimental encephalomyelitis, colitis, peritonitis, oedema, and arthritis through suppression of the inflammatory mediators prostaglandins and leukotriens. The oil and certain active ingredients showed beneficial immunomodulatory properties, augmenting the T cell- and natural killer cell-mediated immune responses. Most importantly, both the oil and its active ingredients expressed anti-microbial and anti-tumor properties toward different microbes and cancers. Coupling these beneficial effects with its use in folk medicine, N. sativa seed is a promising source for active ingredients that would be with potential therapeutic modalities in different clinical settings. The efficacy of the active ingredients, however, should be measured by the nature of the disease. Given their potent immunomodulatory effects, further studies are urgently required to explore bystander effects of TQ on the professional antigen presenting cells, including macrophages and dendritic cells, as well as its modulatory effects upon Th1- and Th2-mediated inflammatory immune diseases. Ultimately, results emerging from such studies will substantially improve the immunotherapeutic application of TQ in clinical settings.