



Antidiabetic Plants for Drug Discovery

Pharmacology, Secondary Metabolite Profiling,
and Ingredients with Insulin Mimetic Activity

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Chapter

The Antidiabetic Effect of Nigella sativa L. with Respect to Its Phytochemicals and the Mechanism of Action

By Iffat Zareen Ahmad

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ABSTRACT

Nigella sativa is a very important seed with immense pharmacological activity. It possesses enormous antidiabetic activity because of the bioactive compounds it harbors. N. sativa is a very popular spice which is used in many Indian cuisines therefore it is a very common nutraceutical and the exploration of its antidiabetic activity could be an excellent contribution to the field of medical science. Because of the toxicity and adverse repercussions of chemical drugs, formulations based on herbal drugs will be a useful alternative for the management of diabetes after deducing its action mechanism and thorough clinical trials. The main antidiabetic compounds of N. sativa which have shown antidiabetic properties include thymoquinone, thymol, thymohydroquinone, dithymoquinone, nigellone, alpha hederin, carotenoids, flavonoids, and fatty acids. N. sativa oil, the seed extracts and purified bioactive compounds have shown remarkable antidiabetic activity in both the in vitro and in vivo research.

The antidiabetic effect can be attributed to the strong antioxidant activities of its phytochemicals, decreased gluconeogenesis, and mimic 194activity similar to insulin at both the cell and molecular levels in different organs. The study has been undertaken using omics approach in which the exploration of enzyme dipeptidyl peptidase 4 inhibitors was done by intrinsic inhibitors. The mechanism of the glucose-lowering effects of thymoquinone using in silico tools has been studied. N. sativa is a promising medicinal seed and its bioactive compounds have the prospective of being important leads to synthesize drugs having antidiabetic activities.