

Antifungal Activity of *Nigella sativa* oil against *Candida albicans* and *Candida utilis*

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Structured Abstract

Background: *Candida* species, especially *C. albicans*, are major fungal pathogens causing infections, particularly in immunocompromised individuals, with treatment complications due to drug resistance. *C. utilis* is generally non-pathogenic and used industrially but can cause rare infections. *N. sativa* (black cumin) has medicinal properties, including antifungal effects, due to bioactive compounds like thymoquinone. These compounds help inhibit fungal growth and enhance immune responses. This study aims to investigate the antifungal properties of *N. sativa* against *C. albicans* and *C. utilis*, determining minimum inhibitory concentrations (MIC) and minimum fungicidal concentrations (MFC), and assessing the percentage inhibition of diameter growth (PIDG).

Methods: The susceptibility test was performed using disc diffusion method. MIC was determined using broth micro-dilution in 96-well plates to observe the lowest concentration of *N. sativa* oil that can inhibit the growth of *C. albicans* and *C. utilis*. The MFC test was performed to determine the concentration that had the fungicidal effect against both strains. The PIDG value was calculated to assess the antifungal efficacy of *N. sativa* oil. All the data had undergone statistical analysis, with significance determined at $p < 0.05$.

Results: Study showed that *N. sativa* exhibited significant antifungal activity against both *C. albicans* and *C. utilis*, with higher concentrations leading to greater inhibition of fungal growth. The MIC for *C. albicans* was found to be 0.11 mg/ml, while for *C. utilis*, it was 0.06 mg/ml. The MFC results indicated complete fungal growth inhibition at 0.45 mg/ml for *C. albicans* and 0.90 mg/ml for *C. utilis*. Statistical analysis confirmed the significance of the findings, highlighting the potential of *N. sativa* as an effective antifungal agent.

Conclusion: In conclusion, the findings of this study indicated that *N. sativa* could serve as a promising natural alternative to conventional antifungal treatments due to the significant effect showed on both strains, *C. albicans* and *C. utilis*. The *N. sativa* oil also offering a cost-effective solution with fewer side effects.

Keywords: candidiasis, antifungal treatments, *Nigella sativa*, minimum inhibitory concentrations, minimum fungicidal concentrations.

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