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Lawsonia inermis Methanolic Extract: Determination of Its Phytochemicals, Antioxidants and Synergistic Effect with Fluconazole in Antifungal Treatment

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Structured Abstract

Background: Fungal infections are becoming a global health issue, affecting over 15 million people. A common fungus involved is *Candida albicans*, which causes candidiasis. Overuse and misuse of antifungal drugs have led to fungi developing resistance, making treatment more difficult. Henna, known as *Lawsonia inermis*, is a common plant that is used in various applications such as treatments to fight infections and cosmetics with dying properties from its pigment. *L. inermis* is utilised to cure infections such as amebiasis, jaundice, skin problems, and headaches. Hence, the aim of the study is to determine the phytochemical and antioxidant activity of *L. inermis* methanolic extract as well as its synergistic effect with antifungal drug, fluconazole against *C. albicans*.

Methods: *L. inermis* powdered leaves were soaked in methanol at the ratio of 1:10 for 72 hours before concentrated using rotary evaporator and keep until further used. The phytochemical screenings were conducted to identify the presence of constituents of *L. inermis* methanolic extract. Next, Liquid-Chromatography Mass Spectrometry (LC-MS) was used to identify specific compounds in the extract. The antioxidant activity of *L. inermis* methanolic extract was determined using hydrogen peroxide scavenging assay to observe the reduction of hydrogen peroxide. Finally, antifungal activity was determined using agar disc diffusion method at different concentrations of extract.

Results: Flavonoids, tannins, alkaloids, glycosides, and saponins were present in the extract. Among the presence of phytochemical compounds, 4-O-Methyl-gallate which was flavonoids were found to be the most abundance in the extract. Moreover, antioxidant activity of *L. inermis* methanolic extract (100%) is superior to the positive control, ascorbic acid (40mM) at concentration of 125 mg/ml which indicates the effectiveness of radical scavenging. Antifungal activity seemed non-resistant against *C. albicans*, yet Fluconazole was resistance to C. albicans based on the inhibition zones. In antifungal activity, *C. albicans* was resistant to all concentration of *L. inermis* methanolic extract despite being susceptible to antifungal drug, Fluconazole.

Conclusion: *L. inermis* methanolic extract contains phytochemical compounds such as flavonoids, tannins, alkaloids, glycosides, and saponins that contribute to the high antioxidant properties. However, *L. inermis* does not have any antifungal properties against *C. albicans*. Further study needs to be done using different methods and solvent extractions to unlock its medicinal potential.

Keywords: *Lawsonia inermis*, Phytochemical compounds, Antioxidant, Antifungal, *Candida albicans*

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