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A Preliminary Study on the Antioxidant Potential of Secondary Metabolites by *Aspergillus flavus*

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Structured Abstract

Background: *Aspergillus flavus* is often recognized for its ability to produce aflatoxin, but few research has also demonstrated its ability to synthesize multiple secondary metabolites, including some antioxidant properties. The main objectives of this research are to determine the total phenolic content (TPC) of *A. flavus* extract using the Folin-Ciocalteu method and to evaluate its antioxidant properties using assays such as DPPH radical scavenging, FRAP, and the β-carotene bleaching assay.

Methods: The methodology includes growing *A. flavus* on Potato Dextrose Agar (PDA) and extracting fungal mycelium. The sample extract was then evaluated using four in vitro antioxidant assays: TPC, DPPH, FRAP, and β-carotene bleaching. This antioxidant activity was observed using UV-VIS spectrophotometry. All samples were prepared in triplicate, and, lastly, statistical analysis was conducted using ANOVA and Tukey's post hoc test to determine the significance of the data.

Results: The antioxidant evaluation revealed that *A. flavus* possessed measurable antioxidant activity across all assays. The total phenolic content of *A. flavus* was lower than that of *A. niger*, indicating a reduced phenolic contribution. In the DPPH assay, *A. flavus* exhibited moderate free radical scavenging activity, as reflected by a higher IC_{50} value compared to the positive control. Similarly, the FRAP assay demonstrated that *A. flavus* had a lower reducing power than *A. niger*. In the β-carotene bleaching assay, *A. flavus* showed a higher bleaching rate, suggesting weaker inhibition of lipid oxidation. Overall, *A. flavus* shows moderate antioxidant activity compared to the higher value obtained by *A. niger.* Nevertheless, it still shows that *A flavus* has a huge potential as an alternative for antioxidant production that can be used in various industries in the future.

Conclusion: In conclusion, the findings of this study may serve as a foundation for future development and further investigation of secondary metabolites produced by *A. flavus*. In addition, this research contributes to the growing body of knowledge on microbe-derived antioxidants and enhances the understanding of *A. flavus* as a potential natural source of antioxidants with significant applications in the cosmetic, food, and pharmaceutical industries.

Keywords: *Aspergillus flavus*, Antioxidant Activity, Total Phenolic Content, Secondary Metabolites, In Vitro Assays

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