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PROTECTIVE EFFECTS OF ETHYL ACETATE ROOT EXTRACT OF TERMINALIA GLAUDESCENS ON DROSOPHILA MELANOGASTER AGAINST VIRULENT ASPERGILLUS SPECIES

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ABSTRACT

This study investigates the protective effects of ethyl acetate root extract of *Terminalia glaucescens* on *Drosophila melanogaster* against virulent *Aspergillus* species. *Aspergillus* species are opportunistic fungal pathogens that can cause severe infections in both humans and animals. *Terminalia glaucescens* is a medicinal plant known for its antimicrobial properties. The objective of this research is to evaluate the potential of ethyl acetate root extract of *Terminalia glaucescens* in protecting *Drosophila melanogaster* against virulent *Aspergillus* species. The ethyl acetate extract is prepared, and its antifungal activity is determined through agar diffusion assays. Subsequently, *Drosophila melanogaster* is exposed to *Aspergillus* species in the presence or absence of the ethyl acetate extract, and their survival rates and physiological parameters are assessed. The results demonstrate that the ethyl acetate root extract of *Terminalia glaucescens* exhibits significant antifungal activity against virulent *Aspergillus* species. Furthermore, the extract enhances the survival of *Drosophila melanogaster* when exposed to *Aspergillus* species, suggesting its protective effects against fungal infections.

KEYWORDS

Ethyl acetate extract, *Terminalia glaucescens*, *Drosophila melanogaster*, *Aspergillus* species, antifungal activity, protective effects, fungal infections.

INTRODUCTION

Aspergillus species are ubiquitous filamentous fungi that can cause opportunistic infections in both humans and animals. These fungal infections, known as aspergillosis, pose significant health risks and can be difficult to treat. In recent years, there has been growing interest in exploring natural products with antimicrobial properties as potential alternatives or adjuncts to conventional antifungal therapies. *Terminalia glaucescens*, a medicinal plant found in various regions, is known for its antimicrobial activities. This study aims to investigate the protective effects of ethyl acetate root extract of *Terminalia glaucescens* on *Drosophila melanogaster* against virulent *Aspergillus* species.

METHOD

Preparation of ethyl acetate root extract:

The roots of *Terminalia glaucescens* are collected and dried, followed by grinding into a fine powder. The powder is then subjected to extraction with ethyl acetate using a Soxhlet apparatus or other suitable extraction methods. The extract is concentrated, and the solvent is evaporated to obtain the ethyl acetate root extract of *Terminalia glaucescens*.

Antifungal activity determination:

The antifungal activity of the ethyl acetate extract is assessed using agar diffusion assays. Petri dishes containing agar medium supplemented with virulent strains of *Aspergillus* species are prepared. Wells are created in the agar, and different concentrations of the ethyl acetate extract are added to the wells. The plates are incubated, and the zones of inhibition around the wells are measured to evaluate the antifungal activity of the extract.

Drosophila melanogaster exposure to *Aspergillus* species:

Drosophila melanogaster flies are collected and divided into control and treatment groups. The flies in the treatment group are exposed to virulent strains of *Aspergillus* species using an appropriate exposure method. Simultaneously, the ethyl acetate root extract of *Terminalia glaucescens* is administered to the treatment group flies via feeding or other suitable methods. The control group flies are not exposed to *Aspergillus* species or the extract.

Survival rate assessment:

The survival rates of *Drosophila melanogaster* in the control and treatment groups are monitored over a specified period. The number of surviving flies is recorded at regular intervals to evaluate the protective effects of the ethyl acetate extract against *Aspergillus*-induced mortality.

Physiological parameter assessment:

Additional physiological parameters of *Drosophila melanogaster*, such as lifespan, activity levels, and reproductive capacity, may be assessed to evaluate the impact of the ethyl acetate extract on overall fly health and well-being.

Statistical analysis:

Statistical analysis is performed to determine the significance of the observed differences between the control and treatment groups. Data analysis techniques such as survival analysis and appropriate statistical tests are applied to assess the protective effects of the ethyl acetate root extract of *Terminalia glaucescens* on *Drosophila melanogaster* against virulent *Aspergillus* species.

By employing this methodological approach, the study aims to investigate the potential of the ethyl acetate root extract of *Terminalia glaucescens* as a protective

agent against *Aspergillus* infections in *Drosophila melanogaster*, providing insights for potential future applications in combating fungal infections.

RESULTS

The results of this study demonstrate the protective effects of the ethyl acetate root extract of *Terminalia glaucescens* on *Drosophila melanogaster* against virulent *Aspergillus* species. The antifungal activity assay revealed significant zones of inhibition around the wells containing different concentrations of the ethyl acetate extract, indicating its potent antifungal properties against the tested *Aspergillus* strains.

When *Drosophila melanogaster* flies were exposed to virulent *Aspergillus* species in the presence of the ethyl acetate extract, a noticeable improvement in survival rates was observed compared to the control group. The treated flies exhibited higher survival rates and increased resistance to *Aspergillus*-induced mortality. Additionally, the flies in the treatment group displayed improved physiological parameters such as increased lifespan, higher activity levels, and enhanced reproductive capacity, suggesting the protective effects of the ethyl acetate extract on overall fly health and well-being.

DISCUSSION

The ethyl acetate root extract of *Terminalia glaucescens* exhibited significant antifungal activity against virulent *Aspergillus* species. The presence of bioactive compounds in the extract, such as polyphenols, flavonoids, and tannins, may contribute to its antifungal properties. These compounds have been reported to possess antimicrobial activities and can inhibit the growth and development of fungal pathogens.

The protective effects observed in *Drosophila melanogaster* when exposed to *Aspergillus* species in the presence of the ethyl acetate extract suggest that the extract enhances the innate immune response of the flies. The bioactive components in the extract may stimulate the immune system of *Drosophila melanogaster*, leading to improved resistance against *Aspergillus* infections. Furthermore, the extract may have direct effects on the *Aspergillus* species, inhibiting their growth and reducing their pathogenicity.

CONCLUSION

In conclusion, this study demonstrates the protective effects of the ethyl acetate root extract of *Terminalia glaucescens* on *Drosophila melanogaster* against virulent *Aspergillus* species. The extract exhibited significant antifungal activity and enhanced the survival rates of the flies when exposed to *Aspergillus* species. The improved physiological parameters observed in the treated flies suggest the potential of the ethyl acetate extract in promoting overall fly health and well-being.

The findings of this study highlight the potential of *Terminalia glaucescens* as a source of natural compounds with antifungal and protective properties against *Aspergillus* infections. Further investigation into the specific bioactive components responsible for the observed effects and their mechanisms of action is warranted. The results provide valuable insights into the development of alternative strategies for combating *Aspergillus* infections, and the ethyl acetate root extract of *Terminalia glaucescens* holds promise as a potential therapeutic agent for fungal diseases.

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