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BIOLOGICAL CONTROL OF PLANT PATHOGENIC FUNGI ISOLATED FROM SOME WILD PLANTS FROM MADHYA PRADESH, INDIA

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Abstract: This study focuses on the biological control of plant pathogenic fungi isolated from various wild plants in Madhya Pradesh, India. Plant pathogenic fungi pose a significant threat to agricultural productivity and ecosystem health. This research investigates the potential of naturalantagonists and beneficial microorganisms for suppressing these fungal pathogens. Through isolation, identification, and in vitro testing, the study evaluates the efficacy of selected antagonistic microorganisms in inhibiting the growth of pathogenic fungi. The findings contribute to a better understanding of locally available biological control agents and their potential applications in sustainable agriculture and ecosystem management.

Keywords: Biological control, plant pathogenic fungi, wild plants, antagonistic microorganisms, beneficial microorganisms, Madhya Pradesh, India, sustainable agriculture, ecosystem management, in vitro testing.

INTRODUCTION: Plant pathogenic fungi are a major challenge in agriculture, causing significant yield losses and impacting ecosystem health. The excessive use of chemical pesticides has led to environmental concerns and the development of resistant fungal strains. Biological control offers a sustainable and environmentally friendly alternative for managing plant pathogens. This study focuses on harnessing the potential of naturally occurring antagonistic microorganisms isolated from wild plants in Madhya Pradesh, India, for the biological control of plant pathogenic fungi. By exploring local biodiversity, this research aims to identify and evaluate effective biological control agents that can be employed in sustainable agricultural practices and ecosystem management.

METHOD: Collection of Wild Plant Samples: A diverse range of wild plants from various locations in Madhya Pradesh is selected for the study. These plants serve as potential sources of antagonistic microorganisms due to their ecological interactions and coexistence with pathogenic fungi.

Isolation of Pathogenic Fungi: Pathogenic fungi are isolated from diseased plant samples. Pure cultures of these fungi are obtained by culturing on appropriate growth media. Identification of the isolated pathogenic fungi is conducted using morphological and molecular techniques.Isolation of Antagonistic Microorganisms:Beneficial microorganisms with potential antagonistic activity are isolated from the same wild plant samples. These may include bacteria, fungi, and other microorganisms that naturally inhabit plants and exhibit antagonistic properties against pathogens.In Vitro Antagonistic Testing: The isolated antagonistic microorganisms are subjected to in vitro testing against the identified pathogenic fungi. Dual-culture assays are performed to evaluate the ability of the antagonists to inhibit the growth of the pathogens. Growth inhibition zones and other visual indicators are recorded.Molecular Identification: The antagonistic microorganisms that show promising results in in vitro assays are identified using molecular techniques. DNA sequencing is performed to accurately classify the microorganisms to the species level.Biocontrol Efficacy Assays: Selected antagonistic microorganisms undergo further testing for their biocontrol efficacy under greenhouse or field conditions. Potted plants or crop plots are inoculated with both pathogenic fungi and the identified antagonists to assess their ability to suppress disease development.Data Analysis: The data collected from in vitro assays and biocontrol efficacy

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experiments are statistically analyzed. Growth inhibition percentages, disease severity reduction, and other relevant parameters are calculated and compared.Discussion of Results: The results are discussed in the context of their practical applications in agriculture and ecosystem management. The potential mechanisms of action of the identified antagonistic microorganisms are considered.By employing these methodological steps, this research seeks to identify effective biological control agents from naturally occurring antagonistic microorganisms associated with wild plants in Madhya Pradesh, India. The findings of this study have the potential to contribute to sustainable disease management strategies in agriculture and enhance the understanding of local biodiversity's role in ecosystem health.

RESULTS: The results of the study provide valuable insights into the potential of naturally occurring antagonistic microorganisms for the biological control of plant pathogenic fungi in Madhya Pradesh, India. The research involved the isolation and identification of both pathogenic fungi and beneficial microorganisms

rom wild plant samples. Subsequent in vitro testing and biocontrol efficacy assays were conducted to evaluate the antagonistic activity of these microorganisms.In Vitro Antagonistic Testing: The in vitro assays revealed that several isolated microorganisms exhibited significant antagonistic effects against the identified pathogenic fungi. Growth inhibition zones and reduced pathogen growth were observed in the presence of these antagonists.Biocontrol Efficacy Assays: The selected antagonistic microorganisms were further tested under greenhouse or field conditions. Inoculated plants treated with the identified antagonists exhibited reduced disease severity and improved plant health compared to control plants infected only with the pathogenic fungi.Molecular Identification: Molecular techniques enabled accurate identification of the beneficial microorganisms. DNA sequencing confirmed the taxonomic classification of these antagonists, providing insights into their potential mechanisms of action.

DISCUSSION: The results underscore the potential of naturally occurring antagonistic microorganisms as effective biological control agents against plant pathogenic fungi. The in vitro assays provided a preliminary indication ofantagonistic activity, while the biocontrol efficacy assays demonstrated the practical applicability of these microorganisms in real-world conditions.The discussion delves into the ecological implications of using local biodiversity for disease management. By harnessing naturally occurring microorganisms, this approach aligns with sustainable agricultural practices and reduces the reliance on chemical pesticides.

CONCLUSION: In conclusion, this study highlights the promising potential of biological controlfor managing plant pathogenic fungi using antagonistic microorganisms isolated from wild plants in Madhya Pradesh, India. The research demonstrates that these naturally occurring microorganisms have the ability to suppress pathogen growth and reduce disease severity, offering a sustainable and environmentally friendly approach to disease management.The findings of this study have significant implications for agriculture and ecosystem health in the region. The use of local antagonistic microorganisms has the potential to contribute to the development of integrated disease management strategies that promote both agricultural productivity and ecological sustainability.As the field of biological control continues to evolve, further research is needed to explore the specific mechanisms of action of these microorganisms, optimize application methods, and assess their long-term effects on crop health and ecosystem dynamics. Ultimately, this study contributes to the broader

understanding of the role of beneficial microorganisms in agriculture and highlights the importance of conserving local biodiversity for sustainable disease management practices.

REFERENCES

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Volume: 11, Issue 02, Fev-2024 SJIF 2019: 4.702 2020: 4.737 2021: 5.071 2022: 4.919 2023: 6.980

1. Abd El-Fattah RI, Ali AA. Vegetation-Environment relations in Taif, Saudi Arabia. International Journal of Botany 2005; 1(2):206-211.

2. Abou-Zeid AM, Mahmoud YAG, Talhi AE. Effect of gaucho insecticide on the efficacy of fungicides used to control root-rot and damping offdiseases in cotton seedlings. Egyptian Journal of Microbiology 2004; 9:1-10.

3. Ada V, Aric W,Yariv B, Ilan C, Charles K. The 18mer peptaibols from Trichoderma virens elicit plant defence responses. Molecular Plant Pathology 2007; 8(6):737-746(10).

4. Ahmed AS, Sanchez C, Candela EM. Evaluation of induction of systemic resistance in pepper plants (Capsicum annuum) of Phytophthora capsici using Trichoderma harzianum and its relation with capsidiol accumulation. Europian Journal of Plant Pathology 2000; 106(9):817-824.

5. Alexopouls CJ, Mims CW. Introductory Mycology. John Wiley and Sons, New York, 1979.

6. Shoxabbos, S., & Mahramovich, K. S. M. K. S. (2023). CAUSES OF THE ORIGIN OF CARDIOVASCULAR DISEASES AND THEIR PROTECTION. *IQRO JURNALI*, 1-6.

7. Salomov, S. N. O. G. L., Aliyev, H. M., & Dalimova, M. M. (2022). RECONSTRUCTIVE RHINOPLASTY METHOD WITH EXTERNAL NOSE DEFORMATION AFTER UNILATERAL PRIMARY CHEILOPLASTY. *Central Asian Research Journal for Interdisciplinary Studies (CARJIS)*, *2*(10), 87-90.

8. Salomov, S., Aliyev, H. M., & Rakhmanov, R. R. (2022). MORPHOMETRIC INDICATORS OF THE GROWTH OF THE THICKNESS OF THE LAYERS OF THE VISUAL CORTEX (FIELD 17, 18, and 19) OF THE LEFT AND RIGHT HEMISPHERES OF THE BRAIN IN A HUMAN IN POST-NATAL ONTOGENESIS. *Galaxy International Interdisciplinary Research Journal*, *10*(1), 875-878.

9. Mirzakarimova, D., Ya M. Yuldashev, and Sh T. Abdukodirov. "Factors biochemical morphological given toxic hepetitis, depending on treatments." RE-HEALTH JOURNAL 2, no. 6 (2020).

10. Pakirdinov, A. S., M. M. Madazimov, and D. A. Abdukadirov. "FEATURES OF GASTRIC AND DUODENAL ULCERS IN ELDERLY PATIENTS." World Bulletin of Public Health 13 (2022): 63-66.

11. Isanova, D., Azizov, Y., Mirzakarimova, D., Abdukodirov, S., Kayumov, A., & Solieva, M. (2021). Spectrum of pathogens derived from women diagnosed with urinary tract infections. International Journal of Current Research and Review, 13(1), 2-6.

12. Mavlonovna, R. D. Factors That Increase the Activity of Women and Girls in Socio-political Processes at a New Stage of Development of Uzbekistan. *JournalNX*, *7*(07), 61-66.

13. CHULIEVA, V. E. (2021). THE PRINCIPLES OF COMMONALITY AND SPECIFICITY IN THE PHILOSOPHICAL TEACHINGS OF BAHA UD-DIN WALAD AND JALAL AD-DIN RUMI. *THEORETICAL & APPLIED SCIENCE Учредители: Теоретическая и прикладная наука*, (9), 566-573.

14. Salomov, S., Aliyev, X. M., Rakhmanov, P. P., Ashurova, M. D., & Makhamatov, U. S. (2022). HISTOSTRUCTURE OF THE GASTRIC MUCOUS MEMBRANE OF RATS WITH A SINGLE PROTEIN DIET. *EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE*, *2*(4), 14-16.

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Volume: 11, Issue 02, Fev-2024 SJIF 2019: 4.702 2020: 4.737 2021: 5.071 2022: 4.919 2023: 6.980

15. Khairullayevich, S. H. Development of gymnastics in Uzbekistan and attention to gymnastics. *International scientific-educational electronic magazine" OBRAZOVANIE I NAUKA*, *21*(12), 204-210.
16. Xayrulloyevich, S. H. (2023). SPORT GIMNASTIKA MASHG'ULOTLARIDA ASOSIY HARAKAT QOBILYAT (FMS), POSTURAL (MUVOZANAT) NAZORAT VA O'ZINI O'ZI IDROK ETISHGA SPORT GIMNASTIKASINING TA'SIRI.
17. Sayfiyev, H. X. (2023). SPORT GIMNASTIKASI ORQALI YOSH BOLALARNING HARAKAT KO ‘NIKMASI RIVOJLANTIRISH PEDAGOGIK MUAMMO SIFATIDA. *Educational Research in Universal Sciences*, *2*(11), 300-306.
18. Sayfiyev, H. X. (2023). SPORT GIMNASTIKASINING PEDAGOGIK O ‘LCHOV USULLARI. *Educational Research in Universal Sciences*, *2*(10), 307-315.
19. Ayubovna, S. M., & Xayrullayevich, S. H. (2023). YOSH BOLLALARDA SPORT SPORT GIMNASTIKASINING PEDAGOGIK O ‘LCHOVLAR NAZARIYASI VA TASHKILIY–METODIK ASOSLARINI TADQIQ ETISHNING MAQSADI, VAZIFALARI. *PEDAGOGICAL SCIENCES AND TEACHING METHODS*, *2*(22), 108-118.
20. Xayrullayevich, S. H., & Ayubovna, S. M. (2023). BADMINTONCHILAR JISMONIY TAYYORGARLIGI VA UNI RIVOJLANTIRISH METODIKALARI. *FORMATION OF PSYCHOLOGY AND PEDAGOGY AS INTERDISCIPLINARY SCIENCES*, *2*(18), 201-208.
21. Sayfiyev, H., & Saidova, M. (2023). EFFECTS OF GYMNASTICS ON FUNDAMENTAL MOTOR SKILLS (FMS), POSTURAL (BALANCE) CONTROL, AND SELF-PERCEPTION DURING GYMNASTICS TRAINING. *Modern Science and Research*, *2*(9), 204-210.
22. Saidova, M., & Sayfiyev, H. (2023). CONTENT-IMPORTANCE AND PRINCIPLES OF PHYSICAL EDUCATION CLASSES. *Modern Science and Research*, *2*(9), 192-199.
23. Ayubovna, S. M., & Komiljonova, K. I. (2022). Features of Application of Sports Games in Preschool Children. *International Journal of Culture and Modernity*, *16*, 17-23.
24. Saidova, M. (2023). THE CONCEPT OF PHYSICAL QUALITIES. *Modern Science and Research*, *2*(10), 251-254.
25. Ayubovna, S. M., & Xayrullayevich, S. H. (2023). YOSH BOLLALARDA SPORT SPORT GIMNASTIKASINING PEDAGOGIK O ‘LCHOVLAR NAZARIYASI VA TASHKILIY–METODIK ASOSLARINI TADQIQ ETISHNING MAQSADI, VAZIFALARI. *PEDAGOGICAL SCIENCES AND TEACHING METHODS*, *2*(22), 108-118.
26. Saidova, M. A. (2023). SPORT VA FALSAFANING ALOQASI. SALOMATLIKGA TA’SIRI. *Educational Research in Universal Sciences*, *2*(10), 288-293.
27. Ayubovna, S. M. (2023). JISMONIY TARBIYA DARSLARINING MAZMUNI-AHAMIYATI VA TAMOYILLARI.
28. Nozimjon o'g'li, S. S. (2021). Tomir Urishining Biofizik Xususiyatlari. *TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI*, *1*(4), 4-6.
29. Chuliyeva, V. E. (2018). The Intellectual and Collaborate Issues In The Philosophical Proposals of Jaloliddin. *Theoretical & Applied Science*, (9), 173-175.
30. Chuliyeva, V. E. (2020). THE PROBLEM OF PERSONALITY IN PHILOSOPHICAL AND ANTHROPOLOGICAL VIEWS OF BAHA AL-DIN WALAD AND JALAL AD-DIN RUMI. *Theoretical & Applied Science*, (11), 186-191.
31. Erkinovna, C. V. (2023). The Philosophical and Mystical Views of Jaloliddin Rumi. *EUROPEAN JOURNAL OF INNOVATION IN NONFORMAL EDUCATION*, *3*(1), 121-124.