

ISOLATION AND IDENTIFICATION OF FUNGI FROM RHIZOSPHERE IN THE VICINITY OF THE INSTITUTE OF AGRICULTURAL SCIENCES UNIVERSITY OF THE PUNJAB, LAHORE PAKISTAN

ATIF M, MANZOOR MT*, SARWAR M, RAFAQAT N

Institute of Agricultural Sciences, University of the Punjab, Lahore, Punjab, Pakistan

*Correspondence author email address: tariq.iags@pu.edu.pk

(Received, 4th January 2019, Revised 23rd December 2019, Published 25th December 2019)

Abstract: Rhizosphere and endorhizosphere microbial colonization aid in phytoremediation, carbon sequestration, and plant development. According to several studies, the microbiomes of various plant species' genotypes and even plant species might vary somewhat. Both pathogenic and symbiotic fungi are associated with the rhizosphere, but the specific fungal communities depend on various conditions, including plant growth and soil type. The present study was conducted to isolate and identify fungus species from vicinity of the Institute of Agricultural Sciences, University of the Punjab, Lahore, Pakistan and identified *Aspergillus*, *Mucor*, *Alternaria*, *Penicillium*, four fungal species from all of the 10 samples.

[Citation: Atif, M., Manzoor, M.T., Sarwar, M., Rafiqat, N. (2019). Isolation and identification of fungi from rhizosphere in the vicinity of the Institute of Agricultural Sciences University of the Punjab, Lahore Pakistan. *Bull. Biol. All. Sci. Res.* 4: 30. doi: <https://doi.org/10.54112/bbasr.v2019i1.30>]

Keywords: Rhizosphere, phytoremediation, pathogenic, symbiotic, fungi

Introduction

The rhizosphere is an extremely favorable environment for various microorganisms' growth, activity, and metabolism. The rhizosphere microflora may be extensively counted through microscopic, cultural, and biochemical methods. For the earth to remain healthy and to support life there, a greater knowledge of the rhizosphere is essential. A small but focused effort is now under work to boost the production potential of major food crops and satisfy the predicted increase in global food demand over the next 50 years (Zhang *et al.*, 2010). The cortex and endodermis's "free space" between cells can be occupied by cations and bacteria in the endorhizosphere (apoplasmic space). The medial zone immediately around the root, which includes the root epidermis and mucilage, is known as the rhizoplane. The ectorhizosphere extends from the rhizoplane into the bulk soil and is the outermost zone. The rhizosphere is not an area with a defined size or shape, as expected, given the intrinsic complexity and diversity of plant root systems. Instead, it comprises a gradient of chemical, biological, and physical qualities that vary radially and longitudinally down the root (Hartmann *et al.*, 2008). A generic name used to describe the symbiotic association between a soil fungus and plant root is mycorrhizae, which derives from the Greek words for fungus and root. Mycorrhizal partnerships, which occur in around 80% of angiosperms and all gymnosperms, are widespread

and largely nonselective, in contrast to rhizobia and their legume partners (Wilcox, 1991). Mycorrhiza aid plants in drawing water, phosphorus, and other micronutrients from the soil (such as Zn and Cu) in exchange for receiving food (carbon) from the plant (El-Morsy, 1999). Rhizosphere fungi naturally create a beneficial symbiotic connection with most plants, giving their hosts nitrogen and phosphorus in exchange. This interaction can considerably increase the efficiency with which plants absorb soil nutrients (Rilling *et al.*, 2018).

Material and Methods

10 trees were selected present in the vicinity of the Institute of Agricultural sciences, University of the Punjab, Lahore, Pakistan including.

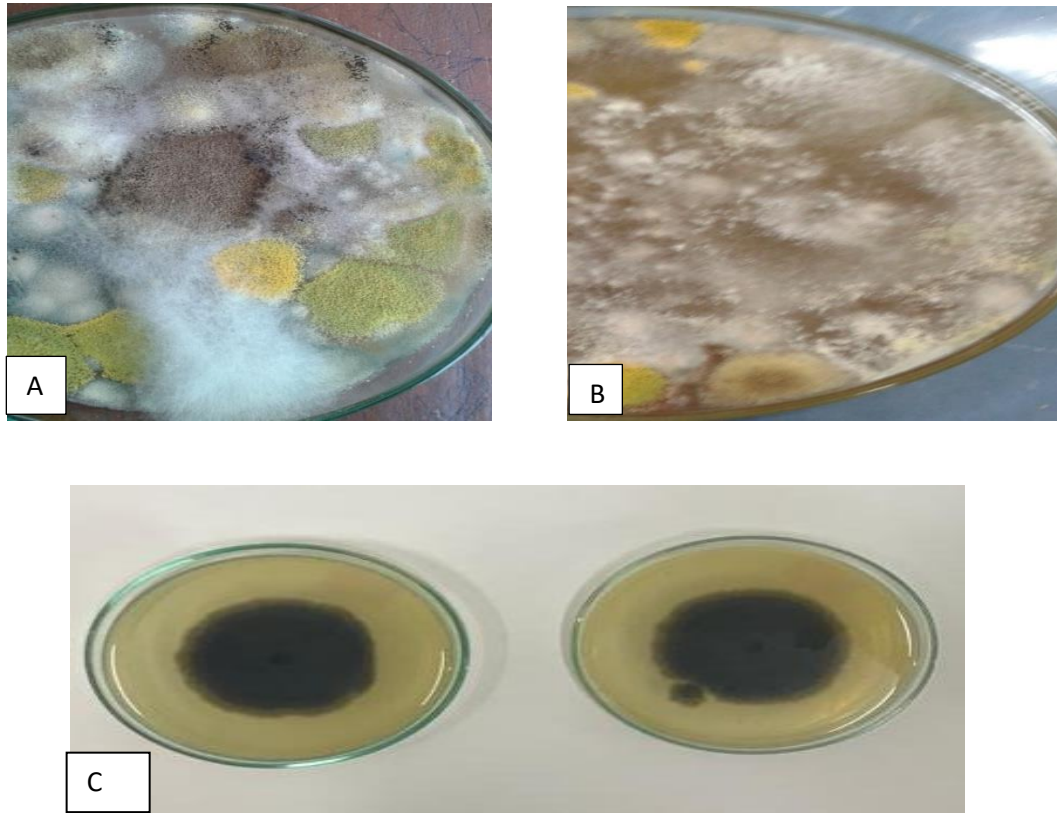
1. *Syzygium cumini* (Jaman)
2. *Mangifera indica* (Mango)
3. *Phoenix dactylifera* (Date palm)
4. *Albizia lebbek* (shareen)
5. *Ziziphus mauritiana* (Bair)
6. *Cassia fistula* (Amaltas)
7. *Acacia nilotica* (kiker)
8. *Dalburgia sisso* (shesham)
9. *Bauhinia variegata* (kachnar)
10. *Capparis decidua* (karir)

The rhizosphere soil was collected in sampling bags, and each soil bag was labelled with the tree name and date of collection. Small rootlets were also collected, adhering to rhizospheric soil. Malt Agar

media is used for growth to isolate and purify fungi. Soil collected from rhizosphere was mixed with water and diluted with water using the serial dilution method. Inoculum was taken by the dropper from the last test tube, put in the centre of the Malt Ager plate, and then spread by the spreader on the whole plate, and the lid was closed. This was repeated for all ten samples. All Media plates were incubated at 25-27°C for 5-7 days.

Results and Discussion

On the 07th day, plates were removed from the Incubators, and the growth of different species of fungi was visible on the plates. A single fungus was selected for the purification of fungi, which occupied more area on artificial media plates. Figure A, and B show media plates with much fungal growth, while C shows purified fungus.



Isolation of fungal microbes from Ten trees

After isolation, microscopy was used to identify fungi in rhizosphere of 10 trees. The Inoculum needle was heated for sterilization purposes, and the inoculum was taken and placed in the center of the slide and stain/ simple water was poured with the dropper. Slides were observed under the microscope. And

identified with their characteristic fruiting bodies and hyphae. *Aspergillus*, *Mucor*, *Alternaria*, *Penicillium*, these four fungal species, were identified in all 10 samples.

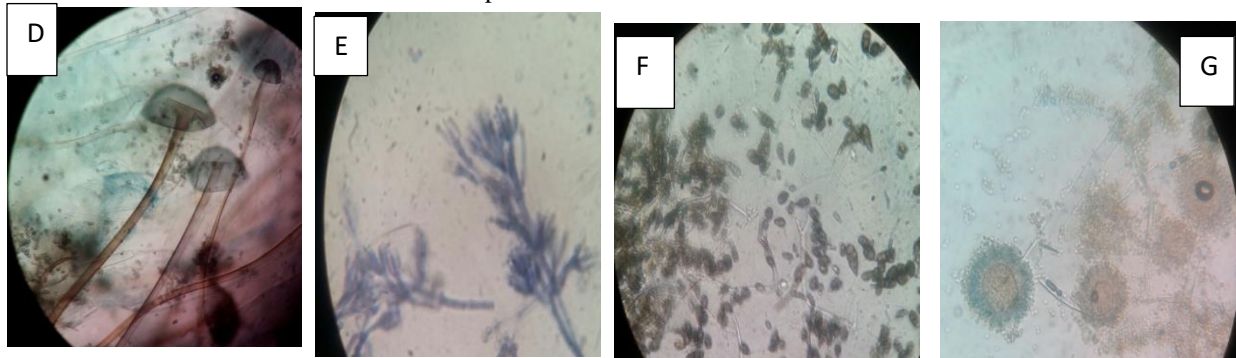


Fig D, *Mucor*, Fig E, *Penicillium*, Fig F, *Alternaria*, Fig G, *Aspergillus*

Conflict of interest

The authors declared the absence of a conflict of interest.

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