

PUBLICATIONS

ISOLATION AND IDENTIFICATION OF BIOACTIVE ENDOPHYTIC FUNGI ASSOCIATED WITH *Eremostachys isochila*

**M. Kholikova¹, Z. Kabirova¹, M. Abduganieva², P. Yuldasheva²,
Asifullah Khan², F. Eshboev²**

¹*Department of Biotechnology and Microbiology, National University of Uzbekistan,
Tashkent 100174, Uzbekistan*

²*Laboratory of Biotechnology and Bioinformatics, Institute for Advanced Studies, New
Uzbekistan University, Tashkent 100007, Uzbekistan*

Endophytic fungi associated with medicinal plants are recognized as promising sources of structurally diverse secondary metabolites with antibacterial, antifungal, antiviral, antioxidant, and other biologically relevant activities. However, the diversity and biosynthetic potential of endophytic fungi associated with medicinal plants of Central Asia remain insufficiently investigated. *Eremostachys isochila* Pazij & Vved., a medicinal plant distributed in Central Asia, represents a potentially valuable source of unexplored endophytic microorganisms and their bioactive metabolites.

The aim of this study was to isolate endophytic fungi from *E. isochila* and identify promising strains based on their antibacterial activity and secondary-metabolite-producing potential. Healthy plant tissues were collected and subjected to surface sterilization followed by cultivation on suitable fungal media. The emerging fungal colonies were purified and maintained as individual strains. A collection of endophytic fungal isolates was obtained and subjected to preliminary screening for antibacterial activity against selected bacterial test organisms. In parallel, the isolates were evaluated for their ability to produce secondary metabolites, and the most promising strains were selected for molecular identification.

Several isolates demonstrated pronounced antibacterial activity and high levels of secondary-metabolite production. Molecular identification was performed using Sanger sequencing of the internal transcribed spacer (ITS) region of ribosomal DNA. Sequence analysis revealed that the selected bioactive and metabolite-producing isolates belonged mainly to the genera *Aspergillus*, *Alternaria*, and *Paraphoma*. Multiple isolates of *Alternaria* were also identified among the promising strains.

The obtained results demonstrate that *E. isochila* harbors a diverse collection of culturable endophytic fungi with significant biological and biosynthetic potential. The identification of *Aspergillus*, *Alternaria*, and *Paraphoma* isolates exhibiting strong antibacterial activity and high secondary-metabolite production highlights their potential as candidates for further natural-product research. Future investigations combining LC-MS/MS-based metabolomic profiling, purification and structural characterization of fungal metabolites, and genome-based analysis of biosynthetic gene clusters will provide further insight into the chemical and biosynthetic diversity of these microorganisms. The study contributes to the exploration of Central Asian medicinal plants as sources of novel bioactive fungal metabolites with potential applications in pharmaceutical and biomedical research.