

Preface

Almost 223 years ago in 1794, the generic name of *Trichoderma* was first introduced by Persoon based on material collected from Germany. *Trichoderma* are fungi ubiquitous in all ecosystems; they are known for their rapid growth and capacity in utilising diverse substrates and are relatively easy to isolate and culture. Over the past decade, they have become a very important resource for the biotechnology industry because of both their ability to secrete large amounts of cellulolytic and hemicellulolytic enzymes and the biocontrol capabilities in some of its species against nematodes, insects, and phytopathogens.

Most of the *Trichoderma* species grow rapidly in artificial culture and produce large numbers of small green or white conidia from conidiogenous cells located at the ends of conidiophores. Morphology characters are variable to a certain degree in their color, shape of conidia, conidiophore, pustules, phialade, and chlamydo spores. These characters allow a comparatively easy means for identifying *Trichoderma* as a genus, but the species concept is difficult to deduce and there is considerable confusion over the application of specific names. The taxonomy of *Trichoderma* is rather difficult and complex due to the plasticity of characters based on classical approaches. Molecular tools have revolutionised systematic and phylogenetic research and are now routinely used in systematic laboratories. Most journals publishing molecular phylogenies required the sequences to be deposited in accessible repositories. However, as more molecular data becomes available, there is a growing concern about the taxonomic origin of this data. Although some taxa appear to be well outlined and easy to recognise, others can only be identified by a handful of specialists. Nowadays, there are a large number of sequences deposited in GenBank that are incorrectly labeled and, unless remedied, these will continuously be associated with the wrong taxa. In my opinion, an essential link between data and taxa can provide a means to verify the taxonomic characters of the isolates sequenced, and macroscopic and microscopic characteristics. Otherwise, a species level identification study cannot be corrected or uncorrected and the user has to rely on the person making the misidentification.

For this situation, the Practical Handbook has described a right pathway to solve the controversial identifications of twelve (12) *Trichoderma* species and also provide clear in-depth information in each chapter—introducing the basic concept of microbiology, collection and processing for *Trichoderma*, slide culture techniques, macroscopic and microscopic analysis, and molecular tools using detailed photographs or drawings of the strains. It is easy to ensure and recognise the quality of the results, even though it is possible to go back to the source of the information. In conclusion from the above discussions, the Practical Handbook has entirely described the combination of macroscopic and microscopic characteristics, and molecular data that are undoubtedly identified at the species level as a paradigm reference for the accurate identification of *Trichoderma* species.

Although this Practical Handbook will be of use to anyone interested in the subject matter, it will be of particular benefit to specialized microbiologists/researchers/lab technician as well as those who simply use microbiology as an adjunct to their own discipline, in finding relevant information quickly and easily.

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