

TAXONOMY & ECOLOGY

Beyond Classical Approaches

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**Fasihuddin B. Ahmad, Sepiah Muid, Isa B. Ipor,
Ramlah Zainudin, Mohd Effendi Wasli,
Meekiong Kalu & Zaini B. Assim**



CHARACTERIZATION OF *PENICILLIUM* SPECIES FROM MEDICINAL PLANTS

*Noraishah, M.B and Sepiah, M.

Department of Plant Science and Environmental Ecology
Faculty of Resource Science and Technology
Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak.
*Corresponding author e-mail: aishah.mbasarom@gmail.com

ABSTRACT

Penicillium species were isolated from medicinal plants which are found in Kuching area. Growth pattern of five different isolates of the *Penicillium* on Czapek yeast agar (CYA) as standard media for *Penicillium* were studied. Each of the isolate revealed different growth pattern. Macro- and micro-morphological characteristics each isolate of the *Penicillium* were observed based on their culture growth in standard condition for identification. Characteristics each of the isolate can be differentiated and these main characteristics were compared with previous study for the identification of the fungus. The species identification has been also confirmed by direct sequencing of amplified ITS region of fungi ribosomal DNA.

Keywords: *Penicillium*, endophyte fungi, fungal growth, medicinal plants.

INTRODUCTION

Penicillium is well known as a diverse and complex genus to study. This genus generally considered as soil fungi with decomposition as its main function. The morphology of this fungal group is complex and is not easy to differentiate between them. As decomposer fungi, this genus has great importance in ecosystems, agriculture, and biotechnology (Shirly *et al.*, 2010; Chekireb *et al.*, 2009; Pitt, 1994).

Since *Penicillium* is very important for human and ecology, many studies have been done to look at various aspects regarding them. The interaction between endophytic *Penicillium* with their host also gets concern by scientist because some metabolites functioned as anti-pathogenic in their host (Santamarina *et al.*, 2002). *Penicillium chrysogenum* is commonly known as fungi with penicillin as active metabolite which is important in antibiotic production. Apart from antibiotic production, *Penicillium* species also found very useful in other medical usage. Penicidones A-C (Hui *et al.*, 2007) and polyketides (Lin *et al.*, 2007) from endophytic *Penicillium* sp. posses cytotoxicity against cancer cell lines.

The existing of endophyte *Penicillium* species in medicinal plants may significant to the function of the plants itself. They may contribute to the host for medicinal

properties from bioactive metabolites. Shankar (2008) found that *Penicillium* and few others fungi were most common endophytic fungi from shrubby medicinal plants in Shouthern India.

Before the relationship between the host and the fungus itself being studied, the characterization and identification of the species found as endophyte in the plants should be concerned. At present, different techniques have been considered for identification. For instance, metabolites production characterization. Metabolite production becomes an important key of species identification since different species may produce different metabolites function (Frisvad & Samson, 2004). Another method has widely been used for identification is by molecular technique. Due to the complexity of the species taxonomy, molecular data play a larger role in species concepts, since it would allow faster and easier identification (Yasser *et al.*, 2007). But, morphological data is still the most important taxonomic character used in *Penicillium* taxonomy.

Hence, the purpose of this study was to isolate and identify *Penicillium* species in medicinal plants which are commonly found in this country.