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Molecular profiling and antimicrobial potential of endophytic *Gliomastix polychroma* CLB32 inhabiting *Combretum latifolium* Blume

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Fungal endophytes as a source of bioactive metabolites have led to the development of pharmaceutical products finding new applications. In a survey of endophytic fungal biodiversity, an antimicrobial endophytic strain CLB32 was isolated from the leaf of *Combretum latifolium* Blume (Combretaceae) from the Western Ghats of Southern India. CLB32 was then identified as *Gliomastix polychroma* (KR704576) by morphological and phylogenetic analysis based on internal transcribed spacer (ITS) nuclear rDNA and intervening 5.8S rRNA gene. CLB32 here constituted the first report on incidence of endophytic fungi from *C. latifolium* Blume. Ethyl acetate fraction of strain CLB32 was evaluated for antimicrobial activity by disc diffusion assay. Secondary metabolites produced effectively inhibited methicillin-resistant *Staphylococcus aureus* (18.33 ± 0.33 mm), *Pseudomonas aeruginosa* (14.66 ± 0.33 mm) and *Candida albicans* (14.00 ± 0.57 mm). Biosynthesis of these antimicrobial compounds was detected by analytical TLC-bioautography method as depicted by zone of inhibition on intensive the band. These findings suggest that *G. polychroma* CLB32, as a producer of natural antimicrobial drugs, could help to combat against multidrug-resistant infections and also provide baseline information for industrial applications.

Keywords: endophytic fungi; multidrug resistance; antimicrobial metabolites; TLC-bioautography

1. Introduction

Emergence of multidrug-resistant (MDR) microorganism infections has generated considerable attention in recent decades (Boucher et al. 2008; Cars et al. 2008). Antibiotic resistance is one of the greatest challenges facing modern medicine (Spellberg et al. 2008). Antibiotics that lose their effectiveness for treating human disease through antibiotic resistance must be replaced with new drugs (Hamad 2010). The massive increases in trade and human mobility brought about by globalization have enabled the rapid spread of infectious agents, including those that are drug-resistant. World Health Organization (WHO 2014) report on global surveillance of antimicrobial resistance reveals that antibiotic resistance is no longer a prediction for the future, it is happening right now, across the world and is putting the treatment of common infections in the community and hospitals at risk.

Biodiscovery from microbial resources helps in the exploration of microbial metabolic products to detect, identify and evaluate their potential for medicinal, agricultural and biotechnological operations (Krutboke 2010; Baker et al. 2014). Plants lack immune response to certain pathogens, but the endophytes that reside inside the plant tissue enhance the immune response of the plants to fight against invading pathogens (Melotto et al. 2008). Fungal endophytes are polyphyletic group of highly diverse fungi that are defined functionally by their occurrence within tissues of plants without causing any immediate overt effects (Rodriguez et al. 2009). This endophyte–plant interaction induces the production of novel antimicrobial agents and endophyte–endophyte interactions within plants also have the potential to produce novel antimicrobial agents (Bandara et al. 2006; Nutzmann et al. 2011). In recent decades, endophytic fungi from plants have been widely accepted as major sources of drugs. A large number of bioactive compounds with new structures are continuously being isolated from endophytes (Strobel et al. 2004). They are strongly considered as largely unexploited metabolic resources. Therefore, new antimicrobial metabolites continue to be identified from fungal endophyte source.

Combretum latifolium Blume (Combretaceae) is a large climbing shrub that has great ethnomedicinal values (Shrisha et al. 2011). The stem and bark of this shrub are used as insecticides (Suthari et al. 2014). Leaf juice is used in the treatment for dysentery and goitre (Debnath et al. 2014). In view of this, *C. latifolium* Blume is selected to

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