ABSTRACT

Microbial diseases remain to be a major global public health challenge. Their devastating effects have been exacerbated by the development of drug resistant strains. On the other hand, the biodiversity of tropical Basidiomycetes fungi is well recognized as an untapped source of potential bioactive compounds for the development of novel antimicrobials. Thus, in the current study, Basidiomycetes' fruiting bodies were collected from Mt. Elgon National Park forest in Kenya. The spores were cultured on Yeast Malt Agar media (YMG), leading to the establishment of 12 distinct pure fungal cultures of Basidiomycete strains, which were characterized using ribosomal internal transcribed spacer (ITS) DNA. They generally belonged to genera; Inonotus, Fomitiporia, Ganoderma, Skeletocutis, Perenniporia, Favolaschia, Hexagonia, Polyporus, Antrodia and Echinochaete. Fungal mycelia were further fermented in YMG, Q6½ (cotton-seed) and ZM½ (sugar-malt) liquid media for secondary metabolites' production. These were extracted using ethyl-acetate and subjected to antimicrobial assays against Bacillus subtilis, Escherichia coli, Mucor plumbeus and Candida albicans. Antimicrobial activity was exhibited in 9 out of the 12 strains cultured, where antibacterial activity was more pronounced than fungal antagonism. Mycelial crude extracts from strains identified as Skeletocutis nivea and Favolaschia calocera demonstrated the highest activities against bacteria (B. subtilis) and fungal pathogen (C. tenuis), respectively with minimum inhibitory concentration (MIC) values of 4.69 µg/ml and <2.34 µg/ml, as compared to ciprofloxacin and nystatin controls which exhibited MIC values of <2.34 µg/ml each. In addition, crude extracts from Hexagonia sp and Inonotus pachyphloeus inhibited growth of E. coli at 300 µg/ml each, while M. plumbeus growth was inhibited by extracts from F. calocera and S. nivea at 37.5 and 300 µg/ml, respectively. These results clearly demonstrate that Basidiomycetes are a reservoir to antimicrobial fungal metabolites, which can be exploited as lead compounds to address drug resistance menace.

Key words: Drug resistance, basidiomycetes, antimicrobial, fungal metabolites.