



Antiproliferative and Antioxidative Bioactive Compounds in Extracts of Marine-Derived Endophytic Fungus *Talaromyces purpureogenus*

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Endophytic fungi are now recognized as sources of pharmacologically beneficial, novel bioactive compounds. This study was carried out to evaluate antiproliferative and antioxidative potential of a seaweed endophytic fungus *Talaromyces purpureogenus*. Extracts with different solvents of the fungus grown on different liquid media were assayed for the antiproliferative and antioxidative activities. Tested 6 cancer cell lines, the highest antiproliferative activity was observed in ethyl acetate extract of total culture grown in Potato Dextrose Broth for 28 days in a dose-dependent manner. The highest antioxidative activity was observed in hexane extract of fungal culture grown in Malt Extract Broth for 21 days. Analyzed for secondary metabolites, the extract revealed the presence of phenolics, alkaloids, flavonoids, steroids and terpenoids. Further, Gas Chromatography Mass Spectroscopy (GCMS) analysis of the extract revealed the presence of several compounds including 3-nitropropanoic acid, 4H-pyran-4-one 5-hydroxy-2-(hydroxymethyl), hexadecanoic acid, and octadecanoic acid, known to be cytotoxic or antioxidative. Among different cell lines tested, HeLa cells were the most vulnerable to the treatment of the fungal extract with an IC_{50} value of $101 \pm 1 \mu\text{g/mL}$. The extract showed no significant cytotoxicity to the normal human embryonic kidney cell line (HEK 293 T) in the MTT assay. The ethyl acetate extract induced membrane damage and mitochondrial depolarization and thereby apoptosis and cytotoxicity in HeLa cells. The study marks marine-derived endophytes as potential sources for discovery of novel drugs.

Keywords: endophytes, *Talaromyces*, anticancer, antioxidative, parameter optimization, apoptosis

INTRODUCTION

Natural product research has occupied a prominent position in pharmaceutical industries and agriculture for development of high-value products for use in human healthcare, nutrition and therapeutics (Kusari et al., 2014; Gupta and Tuohy, 2015; Gill et al., 2016; Fei Law et al., 2017; Masand et al., 2018). Natural product chemistry has also played a vital role in providing better substitutes for existing drugs (Kusari et al., 2014; Kosanić et al., 2016), especially in dreaded diseases like cancer, a major cause of morbidity and mortality in developing and developed countries alike (Mallath et al., 2014; Kilcullen et al., 2016). Taxol[®] is a classic example of natural complex diterpenoids which has gained the status of a blockbuster anticancer drug. *Smilaxnthus sonchifolius*