Bioactive potential from Marine sponge *Callyspongia diffusa* associated *Psedumonas fluorescens* BCPBMS-1 and *Penicillium citrinum*

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Abstract

Background: The exploration for marine sponge associated novel microbes, producing rich and highly potential therapeutic metabolites, could diversify the scopes in life sciences. Since this has remained mostly untouched, the research was carried out to explore the bioactive potential of a marine sponge, *Callyspongia diffusa* associated microbes.

Materials and methods: The strains selected from the *C. diffusa* were *Pseudomonas fluorescens* and *Penicillium citrinum* and their cell free extracts were tested for hemolytic activity on sheep blood agar media and antioxidant activity was assessed with lyophilized cell free extracts. Anticancer activity was performed by cytotoxicity assay against HEP-2 cell lines.

Results: Cell free extracts of both *P. fluorescens* and *P. citrinum* demonstrated α-hemolysis on sheep blood agar. The lyophilized culture filtrate of *P. fluorescens* BCPBMS-1 and *P. citrinum* exhibited concentration dependent antioxidant activity revealing a positive linear relationship and ca. 85% and 74% antioxidant activities were obtained respectively with 1.0 mg/ ml of each of the sample. In case of cytotoxicity assay, *P. citrinum* demonstrated maximum viability of 96.61% at 1.95 µg/ ml of lyophilized culture filtrate and minimum viability of 20.33% at 1000 µg/ ml.

Conclusion: The study proved that both *P. fluorescens* BCPBMS-1 and *P. citrinum* strains produce bioactive metabolites with hemolytic activity and antioxidant activity whereas *P. citrinum* could be a valuable resource for anticancer metabolites.

Significance | Marine microbes are potential resources for the treatment of metabolic diseases.

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Abbreviations: HEP-2; PDA, Potato dextrose agar; TAC, Total Antioxidant Capacity; MTT, 3-(4, 5-dimethyl thiazol-2-yl)-2, 5-diphenyl tetrazolium bromide; DMEM, Dulbecco's Modified Eagle Medium; FBS, fetal bovine serum; DMSO, Dimethyl sulfoxide; MCF-7, breast adenocarcinoma cell lines; NCI-H460, non-small lung cancer cell line; A375-15, melanoma cell lines; EPS, exopolysaccharides.

1. Introduction

Marine sponges are one of the rich sources of highly diverse microbial communities, including more than ten bacterial phyla (such as Proteobacteria, Actinobacteria, Nitrospira, Chloroflexi, lanctomycetes, Cyanobacteria, Acidobacteria), major lineages of Archaea and a range of unicellular eukaryotes like diatoms and dinoflagellates. These organisms as a whole are potentially useful because of their extensive metabolic diversity, including nitrification, photosynthesis, anaerobic metabolism and secondary metabolite production. However, the exact nature of the interactions between sponges and microbes is still an enigma to the scientists if the interaction is predation or parasitism or other types of symbiosis (Vasanthabharathi and Jayalakshmi, 2012).

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