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THE ANTIMICROBIAL PROPERTIES OF MARINE ENDOPHYTIC FUNGI FROM MALAYSIAN GREEN SEAWEEDS

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ABSTRACT

Marine endophytic fungi that live inside seaweed have been studied widely for its active bioactivity. It has been reported that marine endophytic fungi have many bioactivity such as antimicrobial, antioxidant, anti-inflammatory, anticancer and many more. This study focused on the antimicrobial properties of the marine endophytic fungi of green seaweed and to find new sources of antimicrobial agents from natural sources. Twelve extracts (CS_1 PDA, CS_1 3%, UF_1 PDA, UF_1 3%, CR_1 PDA, CR_1 3%, CR_2 PDA, CR_2 3%, CR_3 PDA, CR_3 3%, CF_1 PDA and CF_1 PDA) of the selected marine endophytic fungi (*Caulerpa sertularioides*, *Caulerpa racemosa*, *Ulva fasciata* and *Codium fragile)* were used in this study. The extracts were tested on six species of bacteria (*Escherichia coli, Bacillus subtilis, Pseudomonas aeruginosa, Staphylococcus aureus, Salmonella enterica* and *Salmonella typhimurium*) and three species of fungi (*Aspergillus niger*, *Candida albicans* and *Trichophyton rubrum*). Only seven out of twelve extracts exhibited antimicrobial properties. The most active extract was CS_1 PDA due to its active activity against pathogenic bacteria and fungi tested at moderate level. The highest inhibition of CS_1 PDA on bacteria was on *E. coli* with 15.14% followed by *S. Enterica* (11.30%), *P. aeruginosa* (10.53%), *B. subtilis* (8.91%), *S. aureus* (8.57%) and *S. typhimurium* (5.02%). Meanwhile, the highest diameter of zone inhibition of CS_1 PDA on *Aspergillus niger* was 7.25±0.35 mm, *Candida albicans* was 8.25±0.35 mm and *Trichophyton rubrum* was 7.50±0.71 mm.

Keywords: antimicrobial, green seaweed, *Caulerpa sertularioides*.

CHAPTER 1

INTRODUCTION

1.1 Background

Natural sources have been used as traditional medicine since ages ago by the old folks (Lincoln et al., 1991). Natural products are metabolites that are naturally derived and/or by-products from microorganism, plants or animals (Baker et al., 2000). Leaf, root and stem parts of the plants are considered as natural products (Strobel & Daisy, 2003). The role of natural products in pharmaceutical area was providing lead compounds that are suitable for further modification of drug development (Chin et al., 2006).

Endopyhtes are microbes which live inside of plants tissue without causing harm to the host and producing many bioactive natural compounds (Tan & Zou, 2001; Strobel & Daisy, 2003). Endophytes play symbiotic relationship with the host. The hosts provide nutrients simultaneously the endophytes produce metabolites that help the hosts in defence mechanism against insects, diseases and grazing animals. Endophytes also were believed to boost the host intolerance with drought or other environmental stress (Aldrich-Markham et al., 2007). Endophytes are isolated from two different environments which are terrestrial and marine. They are known as terrestrial endophytes and marine endophytes (Chin et al., 2006; Proksch et al., 2002).