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ANTIBACTERIAL ACTIVITIES OF METHANOLIC PLANT EXTRACTS

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DEPARTMENT OF MICROBIOLOGY

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PENGESAHAN

Dengan ini adalah disahkan bahawa projek bertajuk "**Antibacterial Activity of Methanolic Plant Extracts"** telah disiapkan serta dikemukakan kepada Jabatan Mikrobiologi oleh Mohamad Zulhafiz Shafiq Bin Zulhilmi Cheng (162086) sebagai syarat untuk kursus BMY 4999.

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ABSTRACT

Methanolic extracts of twelve selected plants *Premma cordiflora, Strobilanthes crispus, Cinnamomum iners, Annona squamosa, Barringtonia racermosa, Ipomoea aquatic, Gynura procumbers, Piper betle, Piper nigrum, Vigna unguiculata, Acalypha indica* and *Coleus amboinicus* were tested against *Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus a*nd *Bacillus cereus* upon their antibacterial activities. Recently, some of the enstablish antibiotics have no longer effective to control bacterial diseases due to the occurrence of antibiotic resistance. In this project, all selected plants have shown to have an antibacterial activity toward selected bacteria except for *V. unguiculata* and *A. indica.* Extracts from *C. iners* showed high activity against *E.coli* and *B.cereus.* Throughout the project, 1% of DMSO been selected as negative control while erythromycin, penicillin-G and sulphamethoxazole been selected as the positive control. The minimum inhibitory concentration (MIC) for all the plant extracts been measure by using resazurin as the indicator based on Resazurin Microtiter Dilution Assay (RMDA). Extracts from *C. iners, G. procumbers* and *B. racermosa* have a MIC value at 1.56 mg/ml on *E. coli, K. pneumoniae and S. aureus* respectively while MIC value *of C. iners, A. squamosa and B. racermosa* for on *B. cereus* is 3.125 mg/ml.

ABSTRAK

Esktrak melalui larutan methanol telah dijalankan terhadap dua belas tumbuh-tumbuhan seperti *Premma cordiflora, Strobilanthes crispus, Cinnamomum iners, Annona squamosa, Barringtonia racermosa, Ipomoea aquatic, Gynura procumbers, Piper betle, Piper nigrum, Vigna unguiculata, Acalypha indica* dan *Coleus amboinicus* diuji terhadap *Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus* dan *Bacillus cereus* untuk melihat aktiviti antibakteria yang terhasil. Sejak akhir ini, banyak bakteria dilihat mempunyai kebolehan untuk mengatasi antibiotik sedia ada. Di dalam keseluruhan projek ini, terdapat aktiviti antibakteria di dalam semua ekstrak yang diperolehi kecuali *V. unguiculata* dan *A. indica*.. Ekstrak daripada *C. iners* menunjukkan aktiviti antibakterial yang tinggi terhadap *E.coli* dan *B.cereus.* Seterusnya, 1% DMSO dipilih sebagai kawalan negatif dan erythromycin, penicillin-G dan sulphamethoxazole dipilih sebagai kawalan positif. Untuk ujian kepekatan perencatan minimum (MIC), resazurin telah dijadikan penanda aras berdasarkan resazurin microtiter pencairan assay mikrotiter (RMDA). Ekstrak daripada *C. iners, G. procumbers* dan *B. racermosa* masing-masing mempunyai nilai MIC pada 1.56 mg/ml terhadap *E. coli, K. pnemoniae* dan *S. aureus* manakala nilai MIC bagi *C. iners, A. squamosal* dan *B. racermosa* terhadap *B. cereus* adalah 3.125 mg/ml.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Humans are very dependent upon plants as they give us a lot of benefit whether directly or indirectly. Plants provide oxygen, food, and fuel that needed by human. They also have phytochemical properties that are useful against pathogenic bacteria.

Microorganism inhabits almost every part of human body such as on human skin, in the gut, and in the intestine (Peterson *et al.*, 2009). Bacteria been classified into two categories which are pathogenic bacteria and beneficial bacteria. Pathogenic bacteria can cause infection toward plants and also toward human as most of the infection that occurs in our body is caused by bacteria. On the other hand, bacteria actually can undergo fermentation process such as in wine production and help in decomposition.

However, recent studies show that bacteria can became resistance to the antibacterial or antibiotic (Rodríguez *et al.*, 2013). One of the reasons is the bacteria can evolve and modified itself to counter the antibiotic that been introduced to them. The main purpose why there been a lot of research on the pathogenic bacteria is to find out the solution to overcome the bacteria resistance crisis.

Malaysia is one of the tropical countries in the world and have a lot of natural resources that can benefits the nation. One of them is Malaysia have a lot of tropical plant that can be consumed as food and known as *ulam-ulaman.* These kinds of plant have a lot antibacterial properties which mean that they can be used as antibacterial

agent. There are a lot of research about how Malaysian's plant can actually help in antibacterial mechanism but not all of them been completely studies. So it is an opportunities to study some of the plant that might have this antibacterial effect toward several bacterial.

The objectives of the project were :

i. To extract selected plants using methanolic extraction method.
ii. To test the antibacterial activity of the plant extracts toward selected bacteria.

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