

THE POTENTIAL OF FRUITS AND LEAF EXTRACTS OF  
*Pandanus odoratissimus* AS AN ANTIMICROBIAL AGENT

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**THE POTENTIAL OF FRUITS AND LEAF EXTRACTS OF *Pandanus*  
*odoratissimus* AS AN ANTIMICROBIAL AGENT**

**By**

**Jasmin Binti Jaafar**

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the requirements for the degree of  
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**DECLARATION AND VERIFICATION REPORT**  
**FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled The Potential of Fruits and Leaf of *Pandanus odoratissimus* as an Antimicrobial Agent by Jasmin Binti Jaafar Matric No. UK 25776 have been examined and all errors identified have been corrected. This report is submitted to the School of Marine Science and Environment as partial fulfillment towards obtaining the Degree of Bachelor of Science (Marine Biology), School of Marine Science and Environment, Universiti Malaysia Terengganu.

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## LIST OF ABBREVIATIONS

abs	-	absorbance
mg/ml	-	milligram per millilitre
mm	-	millimetre
nm	-	nanometer
μl	-	microlitre
°C	-	degree celcius

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## ABSTRACT

*Pandanus odoratissimus* have been known as in folklore medicine because of its antimicrobial activities. The antimicrobial activities that have been observed in *Pandanus odoratissimus* may be due to the presence of volatile terpenes alcohols and monoterpene hydrocarbons which reported to exhibit synergic antimicrobial effects. In this study an attempt has been made to find out effect of different extracts (methanolic, hexane and ethyl acetate) of fruits and leaf from *Pandanus odoratissimus* on antimicrobial activities and growth of four target bacteria i.e. *E.coli*, *P.aeruginosa*, *S.aureus* and *B.subtilis*. For antimicrobial activities, two tests are being done which are Disc Diffusion Test and Minimum Inhibition Concentration (MIC). The most active extracts if from *Pandanus* Hexane Core (PHC) and *Pandanus* Ethyl Acetate Key (PEK) of *Pandanus odoratissimus* fruits which have 13 mm and 15 mm of inhibition zone respectively for antimicrobial activities. After that, the most active extracts which are PHC and PEK was further analysis with Minimum Inhibition Concentration (MIC) test and Kinetic Activities test. Different extracts shows different value of MIC. It was found that the PHC and PEK also affecting the growth of the four target bacteria and being compared with normal growth of bacteria without presence of any extracts. After 24 hours, the growth curve of the four target bacteria shows only three phase of growth curve which are lag phase, exponential/log phase and stationary phase. To observe the last phase which is death phase, the analysis may need more than 24 hours period of time. This study revealed that the *Pandanus odoratissimus* fruits demonstrated strong inhibitory effect on the growth of target bacteria than *Pandanus odoratissimus* leaf. The results therefore established a good support for the use of *Pandanus odoratissimus* in traditional medicine.

## POTENSI BUAH DAN DAUN DARI *Pandanus odoratissimus* SEBAGAI EJEN ANTI-MIKROBIAL

### ABSTRAK

*Pandanus Odoratissimus* telah dikenali dalam perubatan tradisional kerana aktiviti anti-mikrobial. Aktiviti anti-mikrobial yang telah diperhatikan dalam *Pandanus odoratissimus* mungkin disebabkan oleh kehadiran terpenes menentu alkohol dan hidrokarbon monoterpena yang melaporkan untuk mempamerkan kesan anti-mikrobial sinergis. Tetapi, sesetengah ekstrak yang dijumpai tidak dapat menghalang pertumbuhan bakteria patogenik kerana bakteria patogenik tersebut mempunyai beberapa jenis mekanisme rintangan. Dalam kajian ini suatu uji kaji telah dijalankan untuk mengetahui kesan ekstrak berbeza (metanol, heksana dan etil asetat) buah-buahan dan daun dari *Pandanus odoratissimus* terhadap aktiviti anti-mikrobial dan pertumbuhan empat sasaran bakteria iaitu *E.coli*, *P.aeruginosa*, *S. aureus* dan *B.subtilis*. Untuk aktiviti anti-mikrobial, dua ujian telah dijalankan iaitu Cakera Resapan Ujian dan Perencatan Minimum Kepekatan (MIC). Ekstrak yang paling aktif ialah dari *Pandanus* Heksana Teras (PHC ) dan *Pandanus* Etil Asetat Utama (PEK) daripada buah-buahan *Pandanus odoratissimus* yang mempunyai 13 mm dan 15 mm dari zon perencatan masing-masing untuk aktiviti anti-mikrobial. Selepas itu, ekstrak yang paling aktif iaitu PHC dan PEK telah dilanjutkan analisis dengan ujian Perencatan Minimum Kepekatan (MIC) dan ujian Kinetik Aktiviti. Ekstrak yang berbeza menunjukkan nilai yang berbeza daripada ujian MIC. Dari ujian Kinetik Aktiviti, PHC dan PEK telah memberi kesan terhadap pertumbuhan empat bakteria sasaran dan dibandingkan dengan pertumbuhan normal bakteria iaitu tanpa kehadiran

sebarang ekstrak. Selepas 24 jam, lengkung pertumbuhan bagi empat bakteria sasaran hanya menunjukkan tiga fasa keluk pertumbuhan iaitu fasa lag, fasa eksponen / log dan fasa pegun. Untuk mengetahui fasa terakhir iaitu fasa kematian, analisis mungkin memerlukan lebih daripada tempoh masa 24 jam. Kajian ini telah mendedahkan bahawa buah-buahan dari *Pandanus odoratissimus* menunjukkan kesan yg anti-mikrobial yang kuat ke atas pertumbuhan bakteria sasaran daripada daun *Pandanus odoratissimus*. Keputusan daripada analisis ini telah memberikan sokongan yang baik bagi penggunaan *Pandanus odoratissimus* dalam perubatan tradisional.