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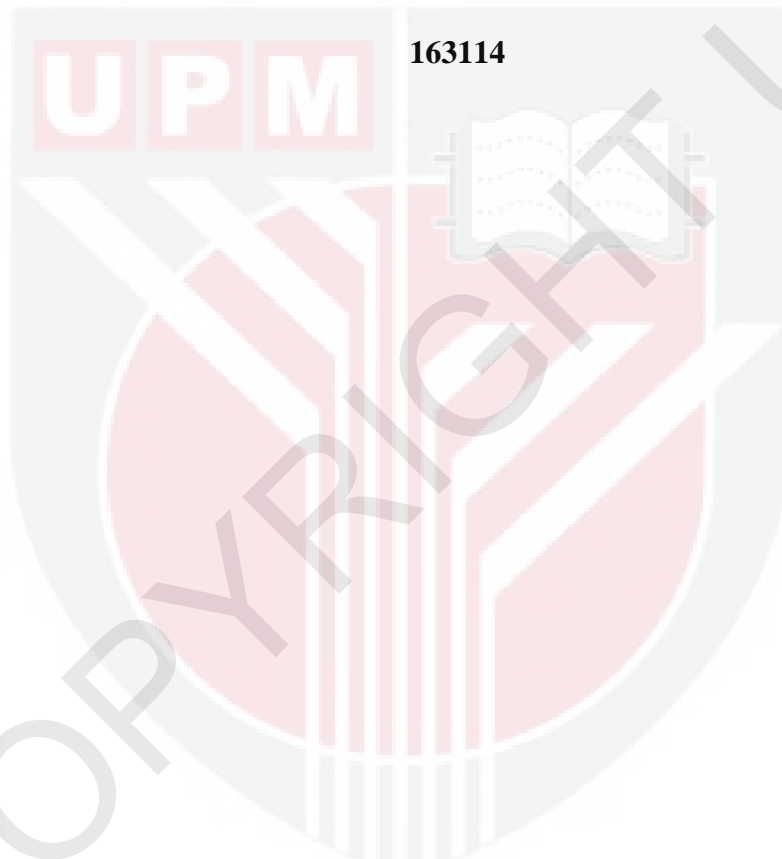
**IDENTIFICATION AND SCREENING FOR ANTIMICROBIAL ACTIVITIES
IN LACTIC ACID BACTERIA FROM YOGURT**

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FBSB 2015 110

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ACTIVITIES IN LACTIC ACID BACTERIA FROM YOGURT**

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**Dissertation submitted in partial fulfillment of the requirement for the course
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PENGESAHAN

Dengan ini adalah disahkan bahawa projek yang bertajuk “IDENTIFICATION AND SCREENING OF ANTIMICROBIAL ACTIVITIES OF LACTIC ACID BACTERIA FROM YOGURT” telah disiapkan serta dikemukakan kepada Jabatan Mikrobiologi oleh MOHAMMAD FAHRULAZRI BIN MOHD JAINI (163114) sebagai syarat untuk kursus BMY 4999 projek.

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ABSTRACT

Objectives of this study were to screening for the antimicrobial activity of lactic acid bacteria, to identify the species of the lactic acid bacteria, and to determine its minimum inhibitory concentration. Four isolates of unknown bacteria were obtained from Mycology Laboratory, Department of Microbiology, Faculty of Biotechnology and Biomolecular Science, UPM. All of the isolates were cultured from four different sources. Among the four isolate, three were observed as *Saccharomyces cerevisiae* or yeast due to its gram stain morphology which is has budding like structure. On the other hand, Y1 show rod shape morphology and gram positive due to its purple colour. Screenings of antimicrobial activity of Y1 show that the growth of *Listeria monocytogenes* and *Escherichia coli* were inhibited by the bacteria. Set of biochemical test was done for Y1 only and Y1 was identified as *Lactobacillus sp.* Critical dilution method determined that the arbitrary unit of the bacteria supernatant inhibit both *Listeria monocytogenes* and *Escherichia coli* were at 20 AU/mL. With regard to the antibacterial effect of the lactobacilli strains in this study, they may help in the treatment of *Listeria monocytogenes* and *Escherichia coli* associated diseases and can be applied as a biological preservative in the food industry.

ABSTRAK

Matlamat kajian ini adalah untuk mengenal pasti spesies bakteria asid laktik, untuk menentukan kebolehnya untuk menghasilkan tindak balas antimicrobial, dan untuk menentukan kepekatan minimum yang diperlukan untuk merenjat pertumbuhan bakteria lain. Empat bakteria yang dipencilkan telah didapati daripada Makmal Mikologi, Jabatan Mikrobiologi, Fakulti Bioteknologi dan Sains Biomolekul, UPM. Keempat-empat bakteria dikulturkan daripada empat sumber yang berbeza. Daripada empat isolat, tiga isolat, iaitu Y2, Y3, dan Y4 telah dilihat sebagai *Saccharomyces cerevisiae* atau yis memandangkan bentuk morfologinya semasa ujian gram stain menunjukkan ianya mempunyai struktur budding. Manakala Y1 pula dilihat mempunyai struktur seperti rod dan mempunyai warna ungu.. Aktiviti antimicrobialnya pula dilihat berkesan untuk merenjat dua spesies patogen iaitu *Listeria monocytogenes* and *Escherichia coli*. Satu set ujian biokimia telah dilakukan terhadap Y1 dan Y1 telah dikenal pasti sebagai *Lactobacillus sp.* Teknik pencairan kritikal telah menentukan bahawa unit arbitrari untuk supernatant bakteria ini untuk merenjat pertumbuhan *Listeria monocytogenes* dan *Escherichia coli* adalah pada skala 20 AU/mL. Berdasarkan kebolehpayaan strain lactobacilli dalam kajian ini untuk merenjat bakteria, mungkin ianya boleh digunakan untuk membantu dalam rawatan penyakit berkaitan *Listeria monocytogenes* dan *Escherichia coli* dan boleh diaplikasikan sebagai penjerukan biological dalam industry pemakanan

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LIST OF ABBREVIATIONS

LAB	Lactic acid bacteria
μL	micro litre
g	gram
mg	miligram
μg	microgram
NB	nutrient broth
OD	optical density
nm	nanometre
L	litre
mL	millilitre
EHEC	Enteromorrhagic <i>Escherichia coli</i>
Da	Dalton
Cfu	colony forming unit
$^{\circ}\text{C}$	Degree Celsius
nm	nanometers
GC content	guanine-cytosine content
M	molarity
AU	arbitrary unit

CHAPTER 1

INTRODUCTION

1.0 Research Background

The markets of healthy food product nowadays are using lactic acid bacteria due to its ability to improve in balance and activity of the intestinal microflora. And approximately 70% of lactic acid produced is used in the food industry because of its role in the production of yogurt and cheese (Salminen et al., 1993). In the co-fermentation of *Streptococcus thermophilus* and *Lactobacillus bulgaricus*, yoghurt is produced as the main product (Castillo et al., 2013). On the other hand, in the manufacture of cheese the pH decrease consequent to lactic acid release triggers the aggregation of casein micelles (Castillo et al., 2013).

Pathogens are bacteria that can be harmful toward the host. An example of pathogenic bacteria is *Listeria monocytogenes*. It is Gram-positive bacteria with non-sporulating bacillus shape and can be isolated from a range of sources including vegetables, processed foods, dairy products, silage and soils (Albano et al., 2007; Alsheikh et al., 2012). *Listeria monocytogenes* can cause diseases such as meningoencephalitis, sepsis, abortion, and gastroenteritis in humans and several species of animals (Buchrieser et al., 2011). Another example pathogen that is well known is *Escherichia coli*. Human infection with EHEC has been associated with consuming food that is contaminated or contact with farm animal (Bach et al., 2002). People that was infected with this bacteria may suffer several disease such as neonatal meningitis, urinary tract infections and gastrointestinal diseases (infantile and sporadic diarrhea, traveler's diarrhea) (Bach et al., 2002).

In this study, I conducted a research on the antimicrobial activity of lactic acid bacteria toward pathogenic bacteria. In this experiment, several lactic acid bacteria were obtained from yoghurt. Lactic acid bacteria were isolated by culturing the yoghurt on top of MRS agar. Several pathogens were chosen to test the antimicrobial activity of the lactic acid bacteria. After that, the minimum inhibitory arbitrary unit of the lactic acid bacteria is determined. The lactic acid bacteria that have antimicrobial activity will be identified later on by biochemical test and Gram staining.

1.2 Hypothesis

Lactic acid bacteria from yoghurt may contain antimicrobial activity.

1.3 Objectives

1. To identify the lactic acid bacteria that has the antimicrobial activity against pathogenic bacteria.
2. To determine the critical dilution of the lactic acid bacteria isolate towards food pathogenic bacteria
3. To identify the genus of the lactic acid bacteria that has the antimicrobial activity.

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