

ANALYSIS AND IDENTIFICATION OF AIRBORNE FUNGUS  
FROM A TETRAHEDRAL PARTICULATE MATTER

FADILAH BINTI MAHABOS

FAKULTI SAINS DAN TEKNOLOGI  
UNIVERSITI MALAYSIA TERENGGANU  
2007



ANALYSIS AND IDENTIFICATION OF AIRBORNE FUNGI FROM  
ATMOSPHERIC PARTICULATE MATTER

By

Fadilah binti Mahabob

Research Report submitted in partial fulfillment of  
the requirements for the degree of  
Bachelor of Science (Biological Sciences)

Department of Biological Sciences  
Faculty of Science and Technology  
UNIVERSITY MALAYSIA TERENGGANU  
2007

1100051126

This project should be cited as:

Fadilah, M.2007. Analysis and identification of airborne fungi from atmospheric particulate matter. Undergraduate thesis, Bachelor Sciences (Biological Sciences). Faculty of Science and Technology, University Malaysia Terengganu.

No part of this report may be produced by any mechanical, photographic, or electronic process, or in the for of phonographic recording, nor may it stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and supervisor of this project.



JABATAN SAINS BIOLOGI  
FAKULTI SAINS DAN TEKNOLOGI  
UNIVERSITI MALAYSIA TERENGGANU

PENGAKUAN DAN PENGESAHAN LAPORAN  
PROJEK PENYELIDIKAN I DAN II  
RESEARCH REPORT VERIFICATION

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **ANALYSIS AND IDENTIFICATION OF AIRBORNE FUNGI FROM ATMOSPHERIC PARTICULATE MATTER** oleh **Fadilah Binti Mahabob**, no. matrik: **UK10395** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains (Sains Biologi), Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

Disahkan oleh:/ Verified by:

  
.....

Penyelia Utama

Nama: Prof Madya Dr Nakisah Mat Amin

Cop Rasmi: **PROF. MADYA DR. NAKISAH MAT AMIN**  
Timbalan Dekan  
Pusat Pengajian Siswazah  
Universiti Malaysia Terengganu (UMT)  
Aras 2, Bangunan Canselori dan Pentadbiran  
21030 Kuala Terengganu

Tarikh: 30/4/07

  
.....

Ketua Jabatan Sains Biologi/Head, Department of Biological sciences

Nama: Dr. Aziz Bin Ahmad

Cop Rasmi: **DR. AZIZ BIN AHMAD**  
Ketua  
Jabatan Sains Biologi  
Fakulti Sains dan Teknologi  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu

Tarikh: 30/4/07

## ACKNOWLEDGEMENTS

In the name of Allah Most Gracious, Most Merciful

I would like thank to my respective supervisor, Assoc. Prof Dr. Nakisah Mat Amin for help, guidance and encouragement during I was doing this project. A lot of thanks, to all people and organization which give me permission to doing sampling activities in the sampling sites. Without their help and permission I will unable to doing this project.

Special thanks to Mr foo, master student who help me in running this project and Chemistry department for giving me permission to use their machine so i were able to finish this project. Besides, I would like to express my thanks to lab assistants for all cooperation given to make the this project rum smoothly Not forgetting all lecturers for their support and guidance.

Furthermore, a lot of thanks to my housemate and coursemate for understanding me and giving me ideas to accomplish this study. Last but not least to my parents and siblings for the enormous support.

May Allah bless all of you.

## TABLES OF CONTENTS

	<b>Page</b>
<b>ACKNOWLEDGEMENTS</b>	ii
<b>LIST OF TABLES</b>	v
<b>LIST OF FIGURE</b>	vi
<b>LIST OF ABBREVIATIONS</b>	vii
<b>LIST OF APPENDICES</b>	viii
<b>ABSTRACT</b>	ix
<b>ABSTRAK</b>	x
<b>CHAPTER</b>	
<b>1    INTRODUCTION</b>	<b>1</b>
1.1    Introduction	1
1.2    Importance of study	3
1.3    Objectives of study	3
<b>2    LITERATURE REVIEW</b>	<b>4</b>
2.1    Air quality and atmospheric particulate matter	4
2.2    Taxonomy of fungal growth	5
2.3    Nature of fungi	6
2.4    Common airborne fungi associated with diseases	7
2.5    Health effects associated with airborne fungi	9
2.6    Diversity of airborne fungi in relation to climate	11

<b>3</b>	<b>METHODOLOGIES</b>	13
3.1	Description of study sites	13
3.2	Collection of samples	14
3.3	Isolation of fungi	15
3.4	Preparation of media	15
3.5	Microscopic analysis of airborne fungi	15
3.6	Identification of airborne fungi	15
<b>4</b>	<b>RESULTS</b>	16
4.1	Types of airborne fungi isolated from six locations of Kuala Terengganu areas.	16
4.2	Number of airborne fungi isolated from six sampling sites	18
4.3	Frequency of airborne fungi found in Kuala Terengganu areas.	19
<b>5</b>	<b>DISCUSSIONS</b>	20
5.1	Airborne fungi isolated from six location of study areas.	20
5.2	Potential health effects of airborne fungi.	23
<b>6</b>	<b>CONCLUSION</b>	24
6.1	Recommendations	24
	<b>REFERENCES</b>	25
	<b>APPENDICES</b>	35
	<b>CURRICULUM VITAE</b>	42



## LIST OF TABLES

<b>Table</b>		<b>Page</b>
3.1	Characteristics of sampling sites.	14
3.2	Types of airborne fungi isolated from six locations of sampling sites.	16

## LIST OF FIGURE

<b>Figure</b>		<b>Page</b>
4.1	Types of fungi isolated from six sampling sites.	17
4.2	Number of fungi isolated from six sampling sites.	18
4.3	Frequency of each type of fungi isolated from six sampling areas.	19

## LIST OF ABBREVIATIONS

° C	-	degree Celsius
µm	-	micrometer
cm	-	centimeter
gm	-	gram
max	-	Maximum
min	-	Minimum
ml	-	milliliter
PDA	-	Potato Dextrose Agar
RH	-	Relative Humidity

## LIST OF APPENDICES

<b>Appendix</b>		<b>Page</b>
A	Flow of methodologies	35
B	Preparation of media	36
C	Morphology of airborne fungi isolated from sampling sites.	37
	Figure 1: <i>Penicillium</i>	37
	Figure 2 : <i>Aspergillus</i>	37
	Figure 3: <i>Cladosporium</i>	38
	Figure 4: <i>Fusarium</i>	38
	Figure 5: Basidiomycetes	39
	Figure 6: Unidentified fungus	39
D	Total suspended Particulate	40
E	Meteorology data	41

## ABSTRACT

The objectives of this study are to analyze and identified the airborne fungi isolated from atmospheric particulate matter. The fungal spores were isolated by using Total Suspended Particulate (TSP). The airborne fungi were identified through their morphology and micro morphology. Results from this study indicated that at least six types or species of airborne fungi have been isolated and identified from atmosphere of Kuala Terengganu areas. *Penicillium*, *Cladosporium*, *Aspergillus*, *Fusarium* one basidiomycetes and one unidentified fungus were obtained in the sampling areas. *Aspergillus* were the most frequent fungi isolated from atmosphere followed by *Penicillium* and *Cladosporium*. Balai Polis Kuala Terengganu showed high occurrences of fungi compared to other places and indicated the area is most polluted compared to others places in term of biotic component contained in atmospheric particulate matter.

# ANALISIS DAN PENGECEMAN KULAT UDARA DARIPADA PARTIKULAT UDARA.

## ABSTRAK

Tujuan kajian ini dijalankan adalah untuk mengasingkan dan mengecam kulat udara dari partikulat udara. Kulat udara diasingkan dengan menggunakan Total Suspended Particulate (TSP). Pengecaman kulat adalah berdasarkan morfologi dan mikromorfologi kulat. Hasil daripada kajian ini menunjukkan sekurang –kurangnya terdapat enam jenis kulat yang terdapat di sekitar atmosfera Kuala Terengganu. *Penicillium*, *Cladosporium*, *Aspergillus*, *Fusarium*, satu kulat dari filum basidiomycetes, dan kulat yang tidak dicam adalah kulat yang diperolehi dari kawasan persampelan. *Aspergillus* adalah kulat yang paling sering didapati daripada atmosfera Kuala Terengganu diikuti dengan *Penicillium*, dan *Cladosporium*. Balai Polis Kuala Terengganu menunjukkan kehadiran kulat udara yang tinggi berbanding tempat lain dan menunjukkan kawasan ini paling tercemar dari segi komponen biotik yang terkandung di dalam partikulat udara.