

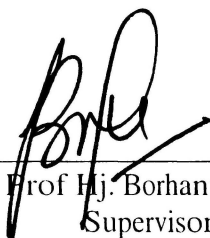
**XYLENE REMOVAL FROM CONTAMINATED AIRBORNE BY
USING ACTIVATED CARBON AND POTASSIUM
PERMANGANATE**

RUWAIDAH BINTI JASMIN

**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Applied Chemistry
In the Faculty of Applied Sciences
University Teknologi MARA**

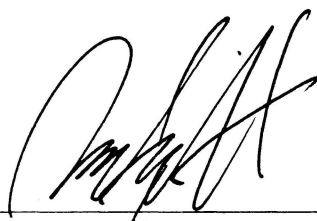
MAY 2009

This Final Year Project entitled “Xylene Removal from Contaminated Airborne by using Activated Carbon Impregnated with Potassium Permanganate, (KMnO₄)” was submitted by Ruwaidah Jasmin, in partial fulfillment of the requirements for Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

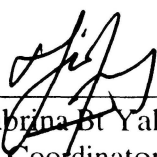


Assoc. Prof. Hj. Borhanuddin Ariffin
Supervisor

B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Encik Shahrudin
Qesh Integrated Consultant Sdn. Bhd.
40450 Shah Alam
Selangor



Cik Sabrina Bt Yahya,
Project Coordinator,
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Dr. Yusairie Mohd,
Head of Program,
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: 10 JUNE 2009

ACKNOWLEDGEMENT

Upon completion of this project, I would like to express my gratitude to many parties. My heartfelt thanks go to my supervisor, Assoc. Prof Hj Borhanuddin Ariffin for his valuable advice, guidance and encouragement throughout the completion of this proposal.

I am deeply indebted to Encik Shaharudin, my co-supervisor, an independent consultant from Qesh Integrated Sdn. Bhd. I would like to express my sincere thanks and appreciation for his valuable advice and guidance His expertise is very crucial to me.

I also extend the gratitude to Cik Sabrina Yahya, coordinator of this final year project for his effective academic hand.

I sincerely thank to all lab assistants and other staffs especially, Science Officer, Pn Shaheeda for their valuable support and cooperation. I also extend the gratitude to other member under same supervision, for all their valuable support. Without their cooperation, it must be the hardest time for me to complete this final project.

Finally, my highest expression of gratefulness is for my parents for their love and support.

Ruwaidah Jasmin

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
CHAPTER 1 INTRODUCTION	
1.1 Background	1
1.2 Significance of study	2
1.3 Objectives of study	2
CHAPTER 2 LITERATURE REVIEW	
2.1 Industrial hygiene	
2.1.1 The relation between OSHA and industrial hygiene	3
2.1.2 Recognition and control of hazard by Industrial Hygienists	
2.2 Xylene	5
2.2.1 Physical and chemical properties of xylene	5
2.2.2 Sources of xylene	6
2.2.3 Exposure Limit	7
2.2.4 Routes of exposure	7
2.2.5 The health effect of xylene	8
2.2.5.1 Effects on animals	8
2.2.5.2 Effects on human	9
2.3 Activated carbon	10
2.3.1 Production of activated carbon	11
2.3.2 Adsorption on activated carbon	12
2.3.3 Impregnation of activated carbon	14
2.4 Air purifier/Cleaners	16
2.4.1 Types of air cleaning device	17
2.4.2 Removal of gases, vapor and odour	22
CHAPTER 3 METHODOLOGY	
3.1 Materials	23
3.1.1 Equipment/Instrument	23
3.1.2 Chemicals	23
3.2 Methods	24
3.2.1 Methods for sampling	24
3.2.2 The parameter for solid adsorbent tube	26
3.2.3 Methods for sample treatment	26
3.2.4 Methods for measurement	26

ABSTRACT

XYLENE REMOVAL FROM CONTAMINATED AIRBORNE BY USING ACTIVATED CARBON AND POTASSIUM PERMANGANATE

People spend 80-90% of their time indoors rather than outdoor. Our indoor environment has important effects on human health and work efficiency. In occupational settings, one of the official agencies, Occupational Safety and Health (OSH), under the Use and Standard of Exposure of Chemical Hazardous to Health Regulation 2000 (USECHH) have established an 8-hour time-weighted average permissible exposure limit (TWA PEL) of 100 ppm or 435 mg/m³ for xylene isomers. Levels only slightly above the 8- hour TWA may cause lack of coordination and amnesia. Even levels lower than 50 ppm can cause drowsiness, moderate fatigue and headache. In this study, it focus on the used of activated carbon impregnated with potassium permanganate to remove xylene from the contaminated airborne for human health. It is an adsorption technique, which is one of the indoor air purification for removing indoor air pollutants and improving Indoor Air Quality (IAQ) under the circumstances that the ventilation and the control of pollution sources are impossible. An analytical method, based on separation with gas chromatography (GC) and Flame Ionization Detector (FID) as detector, was used for the separation, detection and quantitation of xylene and the result shows the concentration of xylene is reduced from 110.6 to 18.1 mg/m³ within 300 minutes of sampling inside the mini booth. A further study is suggested on activated carbon and indoor air quality control for healthy indoor air environment.