

**IDENTIFICATION OF MAJOR ACIDIC AND BASIC SPECIES IN  
SURFACE WATER AT SEMENYIH DAM (SEMI-URBAN AREA)**

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**NOVEMBER 2007**

## ACKNOWLEDGEMENTS

In the name of Allah the most gracious and merciful, with his permission, this Final Year Project has been completed within the required time. I would like to praise Allah for giving me strength and will in completing this project.

Upon completion of this project, I would like to express my gratitude to many parties. My heartfelt thanks goes to my supervisor, Pn. Nesamalar a/p Kantasamy for giving me her guidance and encouragement from the beginning until the completing of this project. I also would like to express my appreciation to Pn. Siti Mariam bt. Sumari had also helped me in this project. My gratitude also goes to the Head Programme of B.Sc (Hons) Chemistry Pn. Hajjah Badariah bt. Abu Bakar for her support during this study.

My special thanks go to my beloved family, especially to my parent, for their understanding, support, advice and encouragement that they gave to me. I also wish to express my thanks to all my classmates of AS202 for their help and support while doing this project.

Norhafiza bt. Abu Bakar

## TABLE OF CONTENTS

	<b>Pages</b>
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	viii
<b>LIST OF ABBREVIATION</b>	ix
<b>ABSTRACT</b>	xi
<b>ABSTRAK</b>	xii
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background	1
1.2 Acid deposition formation	3
1.2.1 Dry deposition	3
1.2.2 Wet deposition	3
1.3 Surface water acidification	4
1.4 Problem statement	5
1.5 Objectives of study	6
1.6 Significance of study	6
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Introduction	7
2.2 Acid deposition issues	7
2.3 Asian scenario on acid deposition	8
2.4 Primary sources of acid deposition	9
2.4.1 Sulfur dioxide (SO <sub>2</sub> )	9
2.4.2 Nitrogen oxides (NO <sub>x</sub> )	10
2.5 Effect of acid deposition on surface water and aquatic ecosystem	13
2.6 Studies related to acidification of surface water	15
2.7 Parameter for acidification	16
2.7.1 Electrical conductivity (EC)	16
2.7.2 pH value	16
2.7.3 Alkalinity	17
2.7.4 Acid neutralizing capacity (ANC)	17

## ABSTRACT

### IDENTIFICATION OF MAJOR BASIC AND ACIDIC SPECIES IN SURFACE WATER AT SEMENYIH DAM (SEMI-URBAN)

Acid deposition was first identified by R.A Smith in England in 19<sup>th</sup> century. Acid deposition appear to be an ecological issue in the late 1960s and early 1970s with acid precipitation and surface water acidification both in Sweden and around Scandavia. Over 30 years scientists have gain greater insight into the ways in which acid deposition has altered ecosystem. East Asia is receiving considerable international attention with respect to potential threats to acid deposition. East Asia already accounts for one-third of total air pollutants worldwide resulted from increasing of energy consumption. The objective of this study is to determine the presence and extent of surface water acidification of Semenyih Dam (semi-urban area) using the pH, alkalinity and also acid-neutralizing capacity (ANC) calculations. The study was conducted for three months from July 2007 to September 2007. Samplings were conducted at four points which are located along the middle of Semenyih Dam. Water samples were analyzed in-situ and in the laboratory for parameters of temperature, pH, and electrical conductivity (EC). The alkalinity and ion measurement analysis were done in the laboratory only. The concentration of base cations ( $\text{Na}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$ ,  $\text{Mg}^{2+}$  except  $\text{NH}_4^+$ ) was analyzed using the Induced Coupled Plasma Optical Emission Spectroscopy (ICP-OES) and the acidic anion concentration ( $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{NO}_3^-$  and  $\text{SO}_4^{2-}$ ) and  $\text{NH}_4^+$  was analyzed with ion chromatography (IC). The results of the concentration major ionic species in the water are as followed:  $\text{Na}^+ > \text{Ca}^{2+} > \text{K}^+ > \text{SO}_4^{2-} > \text{Cl}^- > \text{Mg}^{2+} > \text{NO}_3^- > \text{NH}_4^+$ . The base cations are the predominant species in the water. The pH values of water at four (4) sampling points were around 7 and the alkalinity values were 0.21 meq/L (above 0.002 meq/L), which indicate that the dam was not acidic. The high alkalinity and high ANC values (above 0.200 meq/L) indicate the high buffering capacity of the dam. Therefore, the values of pH, alkalinity and ANC indicate that the Semenyih Dam water resource is currently insensitive to acid deposition and safe for general human consumption and ecosystem.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Acid deposition is the transfer of strong acid and acid-forming substances from the atmosphere to the earth's surface. The composition of acid deposition include ions, gases and particles of sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), ammonia (NH<sub>3</sub>), as well as particulate emission of acidifying and neutralizing compounds.

Acid deposition was first identified by R. A. Smith in England in the 19<sup>th</sup> century (Smith 1872). Acid deposition appear to be an ecological issue in the late 1960s and early 1970s with reports of acid precipitation and surface water acidification both within Sweden and around Scandavia (Oden 1968). At the Hubbard Brook Experimental Forest (HBEF) in North America, the first report of acid precipitation was made, in the remote White Mountain of New Hampshire, based on the collection which begun in the early 1960s. Over the past 30 years, scientists have gained greater insight into the ways in which acid deposition has altered ecosystem. It is now know that acid and acidifying compounds from the atmosphere are transported through soil, vegetation, and surface waters, resulting in adverse ecological effects.