

**CHARACTERIZATION OF RAINWATER: A COMPARATIVE  
STUDY BETWEEN A HOUSING AREA AND AN INDUSTRIAL  
AREA OF SHAH ALAM IN TERM OF ACIDITY**

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**NOVEMBER 2009**

## ACKNOWLEDGEMENTS

Alhamdulillah, a very grateful to ALLAH, The Most Gracious and Most Merciful, for giving me good health and good mind throughout completing this final year project. Upon this opportunity, I would like to thanks my parents, En. Nordin b. Hashim and I and my siblings, Mohd Afiq, Muhammad Nabil and Nurul Athirah for giving me support and encouragement throughout facing the challenges in completing my final year project. I also would like to thanks my supervisor, Mrs. Nesamalar A/P V.Kantasamy for guiding me throughout the whole process of completing my final year project. Further thanks to administrator of Sek. Keb. Padang Jawa and my cousin, Zuraidah and family for permitting me to use their places as the samples locations. Thanks also to Nanotechnology's lab assistant, Pn.Nurul, Nanotechnology's lab technician, En.Azlan, Environment's lab assistants, En.Rosmi and En. Zubir, and research assistant, Cik Nadya in assisting me in doing the analysis. Also, thanks to my friends especially Mohammad Sallehuddin and Yasmin Mohd for giving me hands and opinions. Last but not least, thanks to any individual who have directly or indirectly contributing to the completion of my final year project.

Nurul Najihah binti Nordin.

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## ABSTRACT

### CHARACTERIZATION OF RAINWATER: A COMPARATIVE STUDY BETWEEN A HOUSING AREA AND AN INDUSTRIAL AREA IN SHAH ALAM IN TERM OF ACIDITY

A five weeks study was done for the purpose to compare the characteristics of rainwater between a housing area in Section 9, Shah Alam and an industrial area in Padang Jawa, Shah Alam in term of acidity. Five samples were taken in each area, and the duration for each sample is within a week. By using a multiprobe, physical parameters of rainwater such as temperature and pH were determined. Results shown that temperature of rainwater in industrial area,  $26.06 \pm 0.09^\circ\text{C}$  was higher than the temperature of rainwater in housing area,  $25.21 \pm 0.11^\circ\text{C}$ . The pH of rainwater in housing area,  $7.27 \pm 0.29$  was higher than the pH of rainwater in industrial area,  $7.12 \pm 0.26$ . The pH of rainwater in both housing and industrial areas were even higher than pH of normal rainwater, 5.6. By using Ion Chromatography, anions  $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{NO}_3^-$ , and  $\text{SO}_4^{2-}$  and cations  $\text{Na}^+$ ,  $\text{NH}_4^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{2+}$ , and  $\text{Mg}^{2+}$  compositions were determined. Total anions concentration,  $13.496 \pm 3.137$  mg/L was higher in rainwater of industrial area than in rainwater of housing area,  $1.601 \pm 0.484$  mg/L. Meanwhile, total cations,  $11.811 \pm 1.848$  mg/L was higher in rainwater of industrial area than in rainwater of housing area,  $1.766 \pm 0.76$  mg/L. The ratio [cations]:[anions] in rainwater of housing area was 1.1:1, with neutralization factor of basic cations in rainwater of housing area was 1.9392. Meanwhile, The ratio [cations]: [anions] in rainwater of industrial area was 0.8:1, with neutralization factor of basic cations in rainwater of industrial area was 1.2162. In both housing and industrial areas, the basic cations in the rainwater were able to neutralize as well as buffer the acidic effects of the anions. Therefore, this makes the rainwater in both housing and industrial areas were not acidic.

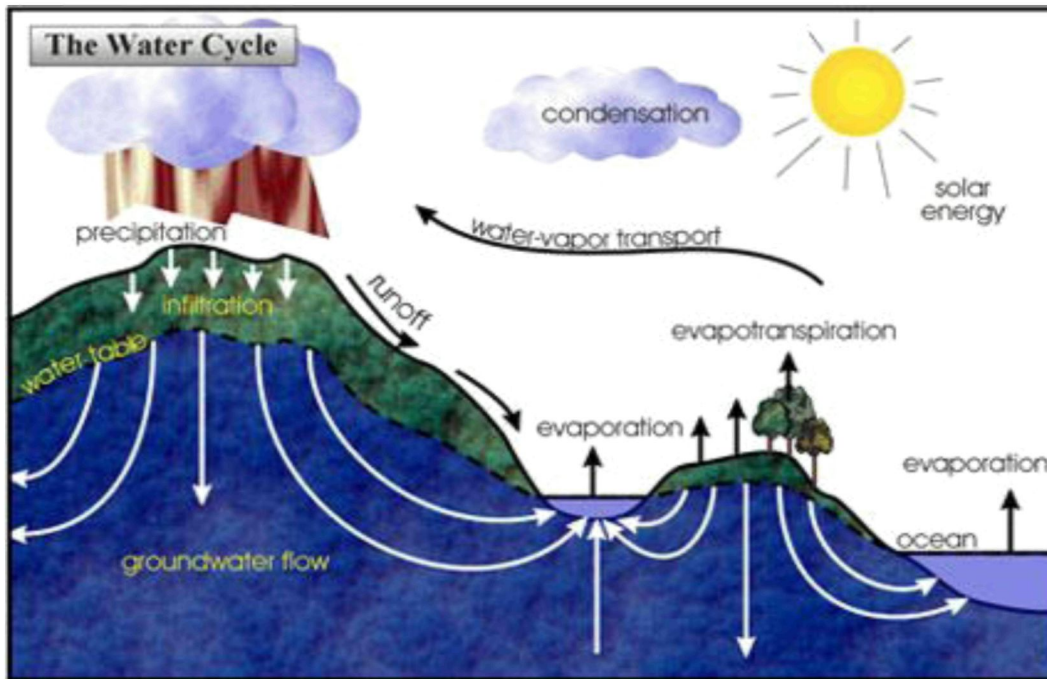
# CHAPTER 1

## INTRODUCTION

### 1.1 Rainwater

Water is the source of all life in the earth. Rainwater is one of the sources of water. Rain is a type of precipitation, a product of the condensation of atmospheric water vapor that is released on Earth's surface.

#### 1.1.1 Formation of rainwater



**Figure 1.1.1** Rainwater formation in water cycle

Source: [www.coastal.edu/wwa/issues/hydrologic\\_cycle.html](http://www.coastal.edu/wwa/issues/hydrologic_cycle.html)