# AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Bachelor, Universiti Teknologi MARA, regulating the conduct of my study and research.

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| Thesis Title | : | Potential of Leucaena Leucocephala Pod and Pineapple Leaf as Biosorbent. |
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| Date | : | January 2019 |

# ABSTRACT

Low-cost adsorbent adsorptions were carried out by different agricultural wastes that are *Leucaena Leucocephala* (LL) and pineapple leaf. Methylene Blue (MB) is used to determine the adsorption of MB onto agricultural waste and removal of MB in the adsorbents. The objective of this study is to study the characterization of LL and pineapple. Analysis for characterization that has been done for this study is TGA, FTIR and UV-Vis Spectrophotometer. From the results, it shown that LL has higher percentage removal of efficiency (R%) which are 65% and 58% for pineapple leaf. From the results of FTIR, both agricultural wastes contained functional group that help to ease the adsorption process such as N-H group, C-O-C group, C=C group and O-H group. LL has low contained of lignin while pineapple has lignin content in the structure. From this study, it can be proved that LL and pineapple can be the biosorbents.

# ACKNOWLEDGEMENT

Firstly, I wish to thank to Allah SWT for giving me the opportunity to embark on my degree and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Madam Noor Harliza binti Abd Razak. Thank you for all the supports, patience and ideas in assisting me with this project. I also would like to express my gratitude to the lab assistants, En Yazid, Puan Roswati and Puan Rohaida for providing the facilities, knowledge and also assist me on how to get the results from TGA, FT-IR and UV-VIS.

My appreciation goes to my bestfriend, Aiman bin Shaharullah who accompany and help me to find Leucaena Leucocephala and always give me morale support and idea to make this project successful.

Finally, this thesis is dedicated to my beloved parents for the vision and determination to educate me. This piece of victory is dedicated to both of you. Grateful to Allah

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# CHAPTER ONE
# INTRODUCTION

## 1.1 RESEARCH BACKGROUND

Recently, wastewater become a worse issues and has been attracted many opinions over the world. Causes of wastewater mostly were led from human activities. In globally, the demand for water growth and the quantity of wastewater that has been produced by human activities were continuously increased. Wastewater from worldwide was over 80% while 95% of wastewater issues were found in minor urbanized country and it was discharged from industry without any treatment (United, World, & Development, 2017). Increasing of development and the growth of municipal water supply and sanitation systems also one of the factors that contributed to demand increased. According to (United et al., 2017), currently, there are two thirds of population in the world were lived in areas that have the water supply minimum a month per year while approximately 500 million people which lived in areas which the water supply was over the renewable water resources. There are few factors that led to the issues where water supplies were exceeds the renewable water resources. One of them is highly exposed areas where the non-renewable sources were continuously decreased and highly depends on transfer of wastewater from urban areas and always seeking for affordable sources way. Increasing of wastewater effluent from untreated sewage, agricultural effluents and ineffectively wastewater from manufacturing were resulted in the degradation of water quality around the world.

In Malaysia, water pollution is one of major natural problem. The impacts of the problems were give negative impacts on the water resources. Besides that, due to this major problem, the organism living and plants, economies of country and people's health were affected. The total water demand in Malaysia were reduced because of the water treatment is too high and water pollution were not treated for daily usage (Akhtar, 2014). Unfortunately, the huge quantity of water supply was not give adequately because of river pollution (Ling, 2010). The wastewater discharged from