

**UNIVERSITI TEKNOLOGI MARA**

**MATHEMATICAL ANALYSIS ON THE  
EFFECTIVENESS OF COAGULATION USING  
ALUMINIUM SULPHATE AND *MORINGA*  
*OLEIFERA* AS COAGULANT**

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Dissertation submitted in partial fulfillment  
of the requirements for the degree of  
**Master of Science**

**Faculty of Civil Engineering**

July 2016

## AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation 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 Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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Aluminium Sulphate and *Moringa Oleifera* As Coagulant  
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## ABSTRACT

Water is an important element in 21<sup>st</sup> century as this resource has become increasingly polluted. Despite the importance of water for human consumption and development, deterioration of this natural resource is occurring at a critical stage. Population and water resources are closely related as the higher growth rate, the higher demand for clean water supply. With the current water shortage scenario, it is an urgent task to find an alternative in treating the surface water for contingency plan. Shah Alam is one of the examples of modern and a rapid centre of urbanization. There are two lakes which can be foreseen as the potential for water supply for nearby community which are Taman Tasik Shah Alam Seksyen 2 and Taman Tasik Shah Alam Seksyen 7 respectively. Coagulation is the significant stage in conventional drinking water treatment process. However the normal used of alum has been discovered to have many drawbacks which affected the human health. Hence this study is considered to use natural coagulant as an alternative as this substance is environmental friendly without reducing the human health. The investigation of the coagulation process was conducted by using lake water which is aimed to use the natural coagulant for the treatment of this lake water to be used as drinking water supply. Studies on coagulation process were conducted using alum comparing with *Moringa Oleifera* at concentration (10g/L, 20g/L, 30g/L). This research analysis involved the parameters of suspended solids, colour, turbidity, pH, nitrite, nitrate, phosphorus, and COD. Samples were collected from Taman Tasik Shah Alam Seksyen 2 and Taman Tasik Shah Alam Seksyen 7. Further evaluation on the coagulation process was conducted through a series of Mathematical calculation for comparing alum and *Moringa Oleifera* using Stoichiometric Analysis and First Order rate of reaction.

## ACKNOWLEDGEMENTS

To the most Gracious and the most Merciful, Allah (S.W.T) for continuously guiding me, lighting my path, giving me the strength to endure sleepless night after night to put all my works to words on paper. Thank you Allah!

I would like to extend my deepest gratitude to my supervisors Dr. Norhafezah Kasmuri for her unwavering support and mentorship throughout this project. She could not even realize how much I have inspired and learned from her. My greatest thanks also goes out to Prof Lars Meierling, my exchanged program co- supervisor from SRH Heidelberg University.

To my beloved parents and in-laws, I would not be here without your support and encouragement, right from the start. Mok, Rahanat Abdul Kadir Ayoh, Mat Yasin Junus Mak, Rozaini Besah Ayah, A Rahim Abu Bakar.

To each of my family members thank you for always coloring my passing days and supporting me in any possible ways.

To each and everyone who making possible this double Master's degree program between Universiti Teknologi MARA, Malaysia, and SRH Heidelberg University, Germany- Assoc. Prof. Ir. Dr. Hjh. Kartini Kamaruddin, Prof. Madya Dr. Yasmin Ashaari, Dr Amnorzahira Amir from Universiti Teknologi MARA, and Frau Allgeier from SRH Heidelberg University.

To all my friends who are supportive in lending their kind hand when I'm in need.

And finally, and above all, I want to thank my best friend, the father to the ones that I am carrying, Muhammad Nazri. Thank you for your endless patience, helping me with the house chores and love. Allah shall reward you abundantly for everything.

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