UNIVERSITI TEKNOLOGI MARA
Cawangan Terengganu
Kampus Bukit Besi

TITLE:
THE GROWTH TRIAL OF SPINACH USING TEA-CHAR PREPARED AT THE BEST CARBONIZATION TEMPERATURE

SUPERVISOR:
IR. MOHD SAUFI BIN MOHD ZAINI

WRITTEN BY:
AESYA UMAIRAH BINTI SAIFUL NIZAM

SCHOOL OF CHEMICAL ENGINEERING
COLLEGE OF ENGINEERING

2024

AUTHOR'S DECLARATION

" I hereby declare that this report is the result of my own work except for quotations and summaries which have been duly acknowledged."

Name of Student	:	Aesya Umairah Binti Saiful Nizam
Student I.D. No.	:	2022473492
Programme	:	Diploma in Chemical Engineering
College/School	:	College of Engineering/School of Chemical Engineering
Signature of Student	:	.....
Date	:	February 12, 2025

ABSTRACT

Tea-char is a specific type of soil amendment that is produced by pyrolysis method in limited-oxygen environment. It is to enhance soil fertility, nutrient retention and water-holding capacity. This research aims to analyzing the effect of tea-char produced at different carbonization temperatures which is at 400°C, 500°C, and 600°C on its benefit on soil amendment and the impacts of different composition of tea-char and soi on plant growth development. Elemental Analysis (EA) is conducted on the tea-char sample from the pyrolysis process to obtained precise data on the component content in tea-char produced. The result shows the higher carbonization temperature, the higher carbon content within the tea-char. While nitrogen and hydrogen content decrease with higher temperature because of volatilization of organic compound. Also, plant growth conducted to evaluate the efficiency of tea-char as a soil amendment and the result show that tea-char alone is insufficient to support plant growth that stop the plant growth. However, if tea-char is combined with the soil it will significantly enhance the soil health and the plant growth development with the best efficiency compared to soil and tea-char alone. The significant impact is from the tea-char ability to increase soil fertility, nutrient retention and water retention. These researched found that tea-char at 400°C offer the most sustainable and effective soil amendment compared to 500°C, and 600°C. Recommendation to further studies this research is by conducting a lasting long-term effect of tea-char and conduct more detailed chemical properties of tea-char to promote a sustainable agriculture practice in the future.

TABLE OF CONTENTS