UNIVERSITI TEKNOLOGI MARA
Cawangan Terengganu
Kampus Bukit Besi

TITLE:

ASSESSING FISH FARM WASTEWATER AS A SUSTAINABLE GROWTH MEDIUM FOR NANNOCHLOROPSIS sp.

SUPERVISOR:

MADAM NORZILA BINTI MOHD

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	:	Nor Firdia Dayana binti Mohammad Fadzil
Student I.D. No.	:	2022846454
Programme	:	Diploma in Chemical Engineering
College/School	:	College of Engineering/School of Chemical Engineering
Signature of Student	:	
Date	:	1/1/2025

ABSTRACT

The rapid expansion of aquaculture has led to increased nutrient-rich wastewater generation, posing environmental challenges and necessitating sustainable waste management solutions. This study investigates the feasibility of using fish farm wastewater as a sustainable, cost-effective medium for cultivating *Nannochloropsis* sp., a promising microalga for biofuel and aquaculture applications. Two formulations were compared: 100% fish farm wastewater (FF) and a blend of 50% fish farm wastewater with 50% commercial media (50%FF+50%CM). Growth profiles, kinetics, and the elemental composition of dried biomass were evaluated over 20 days. The 100% FF medium exhibited a short lag phase (days 0–4) followed by an exponential phase that reached a maximum biomass of 0.4 g L^{-1} before declining. In contrast, 50%FF+50%CM, with an extended adaptation period, gave a more pronounced exponential phase that produced approximately 0.618 g L^{-1} biomass. Improved growth kinetics for 50%FF+50%CM was supported by a higher specific growth rate, shorter cell division time, and increased biomass productivity. The elemental profile presented higher nitrogen and carbon in the 50%FF+50%CM biomass, reflecting better nutrient uptake and metabolic activity. Overall, supplementing fish farm wastewater with commercial nutrients can significantly enhance microalgal growth and productivity. This offers a promising integrated approach to aquaculture wastewater treatment in addition to finding a sustainable growth medium for microalgae.

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