Yuzuncu Yil University
Journal of Agricultural Sciences
(Yüzüncü Yıl Üniversitesi Tarım Bilimleri Dergisi)
https://dergipark.org.tr/en/pub/yyutbd

ISSN: 1308-7576 e-ISSN: 1308-7584

Research Article

Microalga *Chlorella sorokiniana* Response to Salinity: Effects on Cell Density, Size, and Pigment Accumulation

Marcelita A. JEVA[1], J-Nadine A. JALILUL[2], Jurmin H. SARRI*[3], Melodina D. HAIROL[4]

[1,2,3,4]Mindanao State University-Tawi-Tawi College of Technology and Oceanography, College of Fisheries, Sanga-Sanga, Bongao, 7500 Tawi-Tawi, Philippines
[3]Kastamonu University, Institute of Science, Department of Aquaculture, Kastamonu, 37200, Türkiye

[1]https://orcid.org/0009-0002-4314-0591, [2]https://orcid.org/0009-0008-7388-1511, [3]https://orcid.org/0000-0002-4798-0566
[4]https://orcid.org/0000-0002-2800-667X

*Corresponding author e-mail: jurminsarri@msutawi-tawi.edu.ph

Article Info

Received: 27.03.2025
Accepted: 10.09.2025
Online published: 15.12.2025
DOI: 10.29133/yyutbd.1666510

Keywords

Cell density,
Cell size,
Chlorella sorokiniana,
Pigment accumulation,
Salinity

Abstract: Microalgae, such as those from the genus *Chlorella,* produce biochemical compositions such as lipids, protein, and pigment. This research investigated the effects of different salinity levels in a nutrient medium on the growth and pigment synthesis of *Chlorella sorokiniana*. Microalga *C. sorokiniana* was cultured and grown in 500 mL glass bottle with varying concentrations of sodium chloride (10,15, 20, and 25 g L^{-1} NaCl) in a BG-11 medium, starting at an initial cell density of 2.68 x 10^5 cell mL^{-1}. The cultures were maintained at 20 ± 1 °C, under continuous aeration, with a light intensity of 200 µmol photons m^{-2} s^{-1}, a 24 h light photoperiod, and pH 7.5 ± 0.2. The results revealed that the optimal salinity concentration for enhancing the cell density, and the specific growth was 10 g L^{-1}, demonstrating the highest cell density, exceeding the control group by 1.27-fold cell mL^{-1} at day 15 of the culture period. Additionally, the specific growth rate (SGR) was significantly higher in the 10 g L^{-1} of salinity concentration, achieving (0.05 ±0.14 day^{-1}) as early as day 6 of the culture period compared to the other experimental groups. Cell size also increased significantly with 20 g L^{-1} of salinity concentration (49.91 ± 2.39 µm). Regarding the pigment accumulation, total carotenoid levels and chlorophyll-a, the elevated salinity concentration of 20 g L^{-1} suppresses chlorophyll-a accumulation and exhibited a reduction in total carotenoid pigment accumulation. Thus, these findings suggest that lower salinity levels (10 g L^{-1} NaCl) can effectively enhance the growth of *Chlorella sorokiniana*, while higher salinity levels (20 g L^{-1} NaCl) tend to suppress pigment production, particularly chlorophyll-a and total carotenoids accumulation.

To Cite: Jeva, M A, Jalilul, J N A, Sarri, J H, Hairol, M D, 2025. Microalga *Chlorella sorokiniana* Response to Salinity: Effects on Cell Density, Size, and Pigment Accumulation. *Yuzuncu Yil University Journal of Agricultural Sciences*, 35(4): 587-602.
DOI: https://doi.org/10.29133/yyutbd.1666510

1. Introduction

Microalgae are a diverse group of sunlight-powered organisms, ranging from single-celled species to more complex multicellular forms. They exhibit polyphyletic evolution across multiple biological kingdoms. It is estimated that 200 000 to 800 000 algal species exist worldwide, with