ABSTRACT

This study aims to analyze primary productivity in the waters of Lhokseumawe City and the environmental factors that influence it. The study was conducted in July 2025 at four stations using a purposive sampling method. Primary productivity was measured using the light-dark bottle method, while environmental parameters observed included light intensity, temperature, salinity, pH, DO, current velocity, nitrate, nitrite, and sulfate. To identify the factors influencing primary productivity in the waters of Lhokseumawe City, a multivariate Principal Component Analysis (PCA) statistic was used. Primary productivity in the waters of Lhokseumawe City is classified as Eutrophic (>750 mg C/m^3/day) at Stasion 1 and mesotrophic (200 – 750 mg C/m^3/day) at Station 2 to 4, with light intensity above sea level ranging from 80.83-126-30 lx, temperature 30.56-33.56 °C, salinity 30.44-32.44%, pH 7.69-7.90, current speed 0.05-0.20 m/s, DO 6.84-8.53 mg/L, nitrate 0.15-0.53 mg/L, nitrite 0.01-0.33 mg/L, sulfate 2.83-2.95 mg/L. Meanwhile, the factors that influence primary produktivity in Lhokseumawe City (PCA analysis results) were found in the parameters of salinity (r =0.937) and nitrate (r = 0.911).

Keywords: dark-light bottle, nutrients, PCA analysis, photosynthesis, phytoplankton