## ABSTRAK

According to the United Nations, in 2050 the global population is expected to reach 8.9 billion, increasing pressure on agricultural land and food production. One solution is Film Farming, which enhances food production efficiently and sustainably. This research focuses on developing and testing hydromembranes modified with seagrass carbon dots (C-grass) as Film Farming media to support food security. The study began with the synthesis of C-grass from seagrass using four variations: distilled water extract with and without PEG and ethanol extract with and without PEG. These samples were analyzed using UV-Vis, Photoluminescence, and TEM tests. Hydromembranes were then created with different gelatin and C-grass ratios (10%:0%), (15%:0%), (10%:10%), and (15%:10%). The C-grass films were evaluated for pH, tensile strength, elongation, and water content. A simple UV lamp test showed that all C-grass colloids emitted a green color. Among the formulations, ethanol extract with PEG performed best in UV-Vis, Photoluminescence, and TEM tests. Based on physical and mechanical properties, the optimal C-grass film was F4 (15% gelatin and 10% C-grass). The F4 hydromembrane also demonstrated the best results in growing kale, producing the longest stem (6 cm) and the fastest growth rate (42.95% per day). This study highlights the potential of C-grass Film Farming as an effective, eco-friendly solution for sustainable agriculture.



**Keywords: Carbon Dots, Film Farming, Hydromembrane, Seagrasses**