

ABSTRACT

The agricultural sector is currently experiencing obstacles such as shrinking farmland and a growing population. These circumstances affect the agricultural production index, which is viewed as insufficient in meeting the increasing food needs, particularly in urban regions. As a solution, urban farming has gained attention as a viable method for cultivating crops in limited spaces. The success of this method is strongly supported by technological advancements, especially the use of artificial lighting. This technology plays a vital role in enabling farming practices in confined or indoor environments. Among the various crops suited for urban farming with artificial lighting, microgreens stand out due to their high nutritional value and quick harvest cycle. The artificial lighting system typically employs LED lights, which serve as a substitute for natural sunlight in indoor settings. These lights can be adjusted to provide the appropriate light intensity required for optimal plant development. This study aims to evaluate the effectiveness of two types of lighting systems—one designed through research (homemade) and the other commercially produced (factory-made)—in supporting the growth of kale microgreens. The experiment involved two lighting duration treatments: 6 hours and 12 hours. Key growth indicators, such as plant height and fresh weight, were recorded. The findings show that the homemade lighting system produces better results, with kale microgreens reaching up to 10 cm in height and 18 grams in fresh weight under 12 hours of exposure. This suggests that research-based lighting tools can effectively support urban microgreen cultivation.

Keywords: Artificial lighting, LED, Microgreens, Urban farming.