ABSTRACT

Crop failure is a serious problem often faced by farmers, especially in the cultivation of red spinach Microgreens. Temperature fluctuations, unstable light intensity, and limited planting space in urban areas are the main issues in the cultivation of red spinach Microgreens. The phenomenon of urban farming has emerged as an innovative solution to address land constraints. The main challenge in implementing urban farming is insufficient lighting due to indoor cultivation.

This study aims to design and test a prototype of artificial lighting with parameters of Full red, Full blue, 1:1 color ratios, and natural sunlight exposure for 14-16 hours per day. Red light treatment in the early phase stimulates strong stems, while increased blue light in the subsequent phase improves leaf quality and nutrient content. The 1:1 treatment achieves optimal synergy between stems and leaves, while the conventional method produces a full spectrum, resulting in healthy and balanced plants.

Although artificial lighting is not as strong or complete as natural sunlight, it still provides optimal contributions in enhancing the quality and productivity of red spinach Microgreens, making it an effective solution to overcome climate and space constraints in urban farming.

***Keywords**: Climate Change, Urban Farming, Artificial lighting, Red Spinach Microgreenss, and Plant Productivity*