

**DESIGN, DEVELOPMENT, AND EVALUATION OF AN ORGANIC BASED  
AUTOMATED SYSTEM FOR VERTICAL SOLID MEDIA CULTURE**

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Increasing population and urbanization have limited the cultivable lands remarkably. Busy lifestyle also reduces the time spending on agricultural activities. Home gardening, which is considered a good solution for these problems, is a burgeoning trend leading to organic farming. Therefore, this study aims to introduce an aesthetic automated organic-based vertical solid media culture system for leafy vegetables. It consists of vermicompost generation units, vertical crop growing towers, a nutrient tea collecting tank, and an automated nutrient tea circulation (ANTC) unit having a submersible pump, and pipelines. Vermicomposting generation units were filled with decomposing compost and worms. Decomposed coir dust and half-burnt paddy husk in 1:1 ratio was used as the medium for crops in growing towers. The crop growing towers with vermicomposting units were mounted on the nutrient tea collecting tank. It facilitates the ANTC unit to circulate nutrient tea through the towers with vermicomposting unit and tea collecting unit at uniform intervals. The system was enclosed by an insect-proof net to avoid insect attacks. The performance of the system was evaluated in terms of crop height increasing rate, leaf formation rate, and leaf chlorophyll concentrations (SPAD values) by growing *Kangkung (Ipomoea aquatica)* plants compared to the conventional method. The results showed that crop height increasing rate, leaf formation rate, and SPAD value under the new method were 0.51 cm day<sup>-1</sup>, 0.57 cmday<sup>-1</sup>, and 51.6, respectively while the corresponding figures of the conventional method were 0.46 cmday<sup>-1</sup>, 0.42 cmday<sup>-1</sup>, and 48.9, respectively. It revealed that the parameter values considered were higher and statistically significant ( $p < 0.05$ ) in the developed system. Moreover, the crop was free from pest attacks and leaf damages with the new method. The study concludes that the developed system can be used effectively for the cultivation of *Kangkung* as a protected cultivation method.

**Keywords:** Automated nutrient tea circulation, Nutrient tea, Vermicompost, Vertical crop growing