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Development and Evaluation of Experimental Green Roof Modular System for Tropical Climate

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Abstract

World population is increasing rapidly in urban areas of developing countries than that of developed countries. World urbanisation has also been extensively accelerated since past few decades. As a result, urban heat island phenomenon has taken place; Heat island effect in cities is mainly because of non-natural heat absorbing materials used in buildings and other manmade structures. Natural greenery in the cities has been replaced by concrete yards and most of the cities acceleration with urbanisation with more and more concrete structures. Addition of green infrastructure to cities is also an issue due to lack of sufficient space. Green roofs are now gaining increasing attention in many countries. Green roofing is one of the few technologies of passive cooling for buildings in present society. The modular green roofing system has become one of the best solutions to overcome problems related with thermal comfort in urban areas. The aim of this research was to develop a portable module for the green roof with low weight, less maintenance and with the best edible leafy vegetable variety by considering growth performances of selected varieties. The module was developed by using fiber glass with an area of 1000×500 cm² and a unit weight of 700g-800g. The frame network was fabricated by using wooden strips. Growth medium was prepared by using coir fiber, coco husk and compost mixed media at 1:1:1 ratio. Coco husk chips used as boundary layer. Thickness of the substrate layer was not exceeded 25 mm. *Centella asiatica* and Horse puslane were used as the vegetation for green roof modules. No of leaves, plant height, plant density and chlorophyll content of leaves were used as the parameters to select the appropriate plant variety for the green roof. Horse puslane was selected as the best plant variety for the modules after the statistical analyses.

Keywords: *Centella asiatica*, Chlorophyll content, Green roof modules, Green roofs, Growing medium