IDENTIFICATION OF BEST PLANT COMBINATIONS IN INCREASING THERMAL CONDUCTIVITY OF VERTICAL GREEN SYSTEMS UNDER TROPICAL CLIMATIC CONDITIONS

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Abstract: Vertical greenery systems such as green facades and living walls reduce heat transmission in buildings. The characteristics of the plants used for vertical greenery systems are important for thermal conductivity in a building. The thermal conductivity variation of three types of plant combinations grown on vertical living walls under tropical climate conditions was evaluated in the present study. Three green walls with plant combinations of succulents, annuals and perennials were used in the study. Four chambers of 1m x 1m size were constructed to test the thermal conductivity variations in the above plant combinations against a control treatment with a bare wall. The temperature variations inside and outside of the chamber walls, the surface of the green wall and the air space between the chamber wall and green wall were measured four times a day for a period of two weeks in September 2022. Inside and outside temperature changes with perennial plant combination ranges from -0.46 ℃ to 3.34 ℃, with annual plant combination from 0.06 ℃ to 1.48 ℃, and with succulent plant combination from -0.28 ℃ to 2.64 ℃. The lowest temperature of the living wall surface was shown in the green wall of the succulent plant combination. Based on the results, the annual plant combination reduced temperatures better than the perennial and succulent plant combinations. However, a combination of succulent and other plant types can also be experimented with in future research in further reducing thermal conductivity.

Keywords: Annuals, Perennials, Succulents, Thermal conductivity, Vertical green systems