



# Greening the building with living wall using improved cocopeat medium

H.P.U.K. Pahalagedara <sup>1</sup>, C.P. Rupasinghe <sup>1,\*</sup>, H.K.M. Kumarasinghe <sup>2</sup> and T. Charminda <sup>3</sup>

<sup>1</sup> Department of Agricultural Engineering, University of Ruhuna, Sri Lanka.

<sup>2</sup> Department of Crop Science, University of Ruhuna, Sri Lanka.

<sup>3</sup> Department of Civil Engineering, University of Ruhuna, Sri Lanka.

\* Corresponding author email: chintha@ageng.ruh.ac.lk

**Abstract:** Thermal comfort of urbanized residences decreases due to urban heat island effect. Restoring thermal comfort requires more energy. The green wall concept was proposed as an environmentally friendly solution to this problem. The most popular growth substrate for green wall structures is cocopeat, although its nutrient level is extremely low. The objective of this study was to improve the cocopeat medium with adding agricultural organic biowaste for living walls and to evaluate the temperature reduction performances. The chemical and physical characteristics of different growing media as well as growth parameters were examined and temperature reduction was tested in the space between the wall and plants. A living wall setup was constructed in the premises of the new auditorium, Faculty of Agriculture, University of Ruhuna, utilizing 60cm rain gutter pieces with a volume of 3 liters that were connected to the wall in a wooden frame. Three growing media, including cocopeat + compost mixture, cocopeat + goat manure mixtures, and only cocopeat, were employed with two plant species, *Rhoeo spathacea* and *Petunia*. With four replicates, the split plot experimental design was applied. The standard properties of growth media were fulfilled by most of the chemical and physical properties of the cocopeat + compost medium. The cocopeat + goat manure mixture was found to be the most lightweight medium, with a weight reduction of 85% when compared to typical soil. However, *Rhoeo spathacea* (area coverage) and *Petunia* (height and leaf count) performed the best on cocopeat + compost media. At 12.00 pm, the highest temperature reduction of 3.14 °C was reported in *Rhoeo spathacea* between wall and plant. The cocopeat + compost media was the best potting mixture for plant growth performance. A cocopeat + goat manure combination had the lowest weighted medium.

**Keywords:** Cocopeat, Green wall, Potting media, Temperature, Urbanization