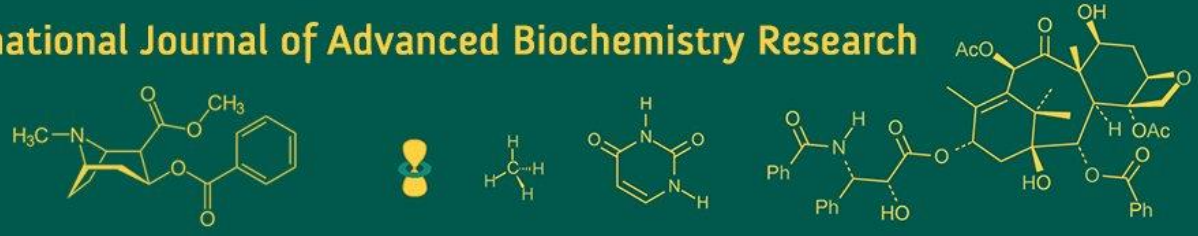
International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2025): 5.29
IJABR 2025; SP-9(10): 2121-2124
www.biochemjournal.com
Received: 13-07-2025
Accepted: 16-08-2025

Savaliya DC
M.Sc. Student (Horticulture) Floriculture and Landscaping, Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, India

Patel MA
Associate Professor, Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, India

Prajapati VG
M.Sc. Student (Horticulture), Floriculture and Landscaping, Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, India

Tandel BM
Associate Professor, Department of Fruit Science, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, India

Dipal S Bhatt
Assistant Professor, Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, India

Corresponding Author:
Savaliya DC
M.Sc. Student (Horticulture) Floriculture and Landscaping, Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, India

Effect of growing media on growth and performance of pothos (*Scindapsus aureus* L.) under modular biowall system

Savaliya DC, Patel MA, Prajapati VG, Tandel BM and Dipal S Bhatt

DOI: https://www.doi.org/10.33545/26174693.2025.v9.i10Sz.6137

Abstract
An experiment entitled "Effect of growing media on growth and performance of pothos (*Scindapsus aureus* L.) under modular biowall system" was carried out at Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat. during the year 2023-24. The experiment was conducted by using eight treatments of media combinations with four repetitions *viz*., M_1-garden soil: perlite: vermicompost (2:1:1 v/v); M_2-garden soil: vermiculite: vermicompost (2:1:1 v/v); M_3-cocopeat: perlite: vermicompost (2:1:1 v/v); M_4-cocopeat: vermiculite: vermicompost (2:1:1 v/v); M_5-peatmoss: perlite: vermicompost (2:1:1 v/v); M_6-peatmoss: vermiculite: vermicompost 2:1:1 v/v); M_7-peatmoss: cocopeat: vermiculite: vermicompost (1:1:1:1 v/v); M_8-peatmoss: cocopeat: perlite: vermicompost (1:1:1:1 v/v). The data were analyzed by using Completely Randomized Design. Among all the media combinations, cocopeat: vermiculite: vermicompost @ 2:1:1 v/v promoted the maximum vine length (22.70 cm), number of leaves/plant (8.34), leaf area (27.64 cm^2), leaf length (8.90 cm), leaf width (5.71 cm), number of roots (12.00), fresh and dry weight of roots (6.60 g and 0.47 g, respectively), fresh and dry weight of shoots (13.74 g and 1.14 g, respectively) as well as root: shoot ratio (0.42). Whereas, the effect of growing media on number of shoots/plant was found non-significant. Similarly, quality parameters *viz*., visual quality grade (7.87 out of 10) and total chlorophyll content at the end of the experiment (0.466 mg/g) were also recorded the highest by the plants grown in cocopeat: vermiculite: vermicompost @ 2:1:1 v/v. Furthermore, the media analysis revealed that the lowest pH (6.19 and 6.34, respectively), EC (0.32 dS/m and 0.44 dS/m, respectively) and bulk density (0.58 g/cm^3 and 0.59 g/cm^3, respectively) before and after the end of the experiment were observed in the media combination of peatmoss: vermiculite: vermicompost @ 2:1:1 v/v. The media combination of cocopeat: vermiculite: vermicompost @ 2:1:1 v/v also recorded the highest water holding capacity before as well as after the end of the experiment (68.75% and 68.54%, respectively), which proved it the best media combination for pothos under modular biowall system.

Keywords: Pothos, growing media, cocopeat, vermiculite, vermicompost, peatmoss, perlite, modular biowall system

Introduction
Scindapsus aureus L. is popularly known as Pothos/Money plant/Devil's ivy belongs to the monocot family Araceae. The name was derived from *Skindapsos*, an ancient Greek name for an ivy-like plant. It is originated to the Southeast Asia and Pacific Islands. Pothos is a low-maintenance, perennial, broadleaved evergreen houseplant and desired for its glossy, green or variegated leaves on cascading stems. Leaves are alternate, ovate, small at juvenile stage, becoming large, lobed or slashed when mature, deep green or splashed or blotched with cream-yellow. It is one of the most preferred house plants throughout the world. It grows 6 to 10 feet as horizontal groundcover but the trailing and climbing vines can grow as long as 40 feet. This feature makes it well suited for hanging baskets and biowall or vertical garden systems. The plant climbs over a support with the help of aerial roots which adhere to rough surface. The flowers are produced in spathe up to 25 cm long. Pothos prefers bright, indirect light but is even able to survive for the longer periods in low light. The growth rate of plant is vigorous during warm and humid period but it slows down during dry and cool period of the year. The plant prefers slightly acidic medium for better growth but foliar loss is common when irrigation water contains higher level of sodium and fluoride salts. Growing media, whether organic or inorganic, plays a crucial role in providing support and

nourishment to plants. Selection of plant specific growing medium is an important aspect of biowall or vertical garden system. Different regions around the world employ a diverse range of soilless media as viable replacements for traditional soil, offering suitable alternatives for plant growth (De-Rijck and Schrevens, 1998) [1]. Different types of growing media such as cocopeat, vermiculite, perlite and peat moss are widely utilized by nurserymen and gardeners. Cocopeat is prepared from the waste of coconut husk and it has good porosity, improved drainage and aeration. Vermiculite is chemically hydrated magnesium-aluminum-iron silicate, having good moisture holding property and obtained after processing of mica at 1090 °C. Perlite is grey-white material originated to salicaceous mineral and holds three to four times more waters to its weight. Peat Moss is least decomposed and derived from sphagnum or other mosses having high water holding capacity and acidic in pH (3.2 to 4.5). Vermicompost is decomposed and rotten material of farm waste prepared by using earthworms and it contains 0.51-1.61% nitrogen, 0.19-1.02% phosphorous and 0.15-0.73% potassium (Nagavallemma *et al.*, 2004) [9].

2. Materials and Methods

The experiment was conducted during October, 2023 to April, 2024 at the Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari. The uniform and healthy cuttings of *Scindapsus aureus* with 8 to 10 cm length along with three nodes were planted under the polytunnel for rooting. The experiment was carried out under modular biowall system. Modular plastic container having top width 11.00 cm, bottom width 8.00 cm and length 11.00 cm were filled as per the treatments with different growing media combinations mixed on the volume basis. The experiment was conducted by using eight treatments of media combination with four repetitions *viz*., M_1-garden soil: perlite: vermicompost (2:1:1 v/v); M_2-garden soil: vermiculite: vermicompost (2:1:1 v/v); M_3-cocopeat: perlite: vermicompost (2:1:1 v/v); M_4-cocopeat: vermiculite: vermicompost (2:1:1 v/v); M_5-peatmoss: perlite: vermicompost (2:1:1 v/v); M_6-peatmoss: vermiculite: vermicompost 2:1:1 v/v); M_7-peatmoss: cocopeat: vermiculite: vermicompost (1:1:1:1 v/v) and M_8-peatmoss: cocopeat: perlite: vermicompost (1:1:1:1 v/v). The well rooted uniform cuttings were transplanted in modular pots filled with media combinations as per the treatment and subjected to acclimatize under tree shade for the one month. Therefore, modular pots with acclimatized plants were installed in the bracates of modular biowall system. Drip irrigation system with emitters of 8 liters/hour (LPH) was installed for irrigation purpose. Plants were irrigated at 7 days interval during December to February and at 3 days interval during March to April. The run period of drip was 3 minutes. The water-soluble fertilizer NPK 19: 19: 19 @ 0.2% (2 g/lit) was applied through foliar application with the help of Knapsack sprayer at 15 days interval to all the treatments. Similarly for micronutrient application, chelated micronutrients grade IV (Zn: 6%, Fe: 4%, Cu: 0.5%, Mn: 1% and B: 0.5%) @ 0.2% (2 g/lit) was also applied through foliar application at two months intervals to all the treatments. For the different growth and quality parameters, five plants were randomly tagged and all the observations taken from three plants and average was calculated.

3. Results and Discussion

3.1 Growth parameters

The data presented in the table 01 indicated that the growth parameters *viz*., vine length, number of leaves/plant, leaf area, leaf length, leaf width, number of roots, fresh weight of roots, fresh weight of shoots, dry weight of roots, dry weight of shoots and root: shoot ratio were significantly influenced by different growing media combinations.

Among different media combinations, growing media M_4-cocopeat: vermiculite: vermicompost @ 2:1:1 v/v promoted maximum vine length (22.70 cm), number of leaves/plant (8.34), leaf area (27.64 cm^2), leaf length (8.90 cm), leaf width (5.71 cm), number of roots (12.00), fresh and dry weight of roots (6.60 g and 0.47 g, respectively), fresh and dry weight of shoots (13.74 g and 1.14 g, respectively) as well as root: shoot ratio (0.42). Whereas, growing media M_1-garden soil: perlite: vermicompost @ 2:1:1 v/v recorded minimum values of vine length (15.04 cm), number of leaves/plant (5.13), leaf area (21.31 cm^2), leaf length (7.44 cm), leaf width (5.20 cm), number of roots (7.25), fresh and dry weight of roots (2.17 g and 0.17 g, respectively), fresh and dry weight of shoots (7.90 g and 0.70 g, respectively) and root: shoot ratio (0.24). Furthermore, among these parameters, vine length, number of leaves/plant, leaf area, leaf length and leaf width showed increasing trend over the period. The reason might be due to cocopeat serves as reservoir for optimum moisture and aeration which facilitated gaseous exchange between the roots and atmosphere outside the growing substrate, vermiculite increased the nutrient availability allowing for a high nutrient uptake efficiency (Pisa *et al.* 2020) [11] and the rich source of nutrients are present in vermicompost. But, the impact of growing media on number of shoots/plant was non-significant. Across all the treatments of growing media, the number of shoots per plant remained constant, with each plant produced an average of only one shoot. Similar findings were reported by Mousa *et al.* (2004) [8] in pothos (*Scindapsus aureus* L.); Ikram *et al.* (2012) [2] in tuberose (*Polianthes tuberosa* L.); Mehmood *et al.* (2013) [6] in floral shower (*Antirrhinum majus* L); Swetha *et al.* (2014) [13] in Aglaonema cv. Ernesto's Favourite; Younis *et al.* (2015) [15] in miniature rose cv. Baby Boomer; Kavipriya *et al.* (2019) [4] in *Dracena reflexa variegeta*; Lakshanthi and Seran (2019) [5] in orchid (*Dendrobium* spp.) and Monika and Chandla (2021) [7] in Chrysanthemum cv. Haldighati.

3.2 Quality parameters

The data from table 02 revealed that growing media significantly influenced the quality parameters *viz*., visual quality and total chlorophyll content.

Visual quality also showed an increase trend over the period. The maximum visual quality grade (7.87) was reported by the plants grown with media M_4-cocopeat: vermiculite: vermicompost @ 2:1:1 v/v. Whereas, minimum visual quality (5.18) was recorded in plants grown with media combination of garden soil: perlite: vermicompost @ 2: 1: 1 v/v (M_1). The increased visual quality grade might be attributed to the cocopeat-amended medium facilitated higher production and accumulation of protein and amino acids compared to the plants grown in peat-amended medium (Scagel, 2003) [12] and improved nutrition from vermicompost enhanced the biochemical properties of plants, such as chlorophyll, enzyme activity and protein synthesis (Tomati *et al.*, 1995) [14]. Present findings are in

line with reports of Zawadzinska and Janicka (2007) [16] in garden pansy (*Viola* × *wittrockiana* Gams.); Swetha *et al.* (2014) [13] in aglaonema cv. Ernesto's Favourite and Kavana *et al.* (2019) [3] in sword fern (*Nephrolepsis undulata* J. Sm.).

Among the different growing media combinations, the highest value of total chlorophyll (0.466 mg/g) was recorded in the plants grown with media M_4-cocopeat: vermiculite: vermicompost @ 2:1:1 v/v. But combination of garden soil: perlite: vermicompost @ 2:1:1 v/v (M_1) reported the lowest value of total chlorophyll content (0.301 mg/g). It might be attributed to the superiority of vermicompost, which have the ability to supply nutrients such as N, P, K, Ca, and Mg in readily available forms. As essential constituents of chlorophyll, N and Mg are crucial for its synthesis. The present result is in agreement with the finding of Kavana *et al.* (2019) [3] in sword fern (*Nephrolepsis undulata* J. Sm.) and Pawar *et al.* (2022) [10] in anthurium cv. Tropical Red.

3.3 Media Analysis

The media analysis was carried out before and after the end of the experiment revealed that the pH, EC, water holding capacity and bulk density of growing media showed significant differences among the different growing media combinations. The media analysis data presented in the Table 03 indicated that the pH and EC of the media showed slightly increasing trend. It might be attributed to accumulation of salts of irrigation water over the days. Whereas, water holding capacity and bulk density showed non-significant differences before as well as after the experiment due to destructive method is used.

Furthermore, peatmoss: vermiculite: vermicompost @ 2:1:1 v/v recorded minimum pH (6.19 and 6.34, respectively) and EC value (0.32 dS/m and 0.44 dS/m, respectively) before and after the end of the experiment. The maximum pH (7.11 and 7.19, respectively) and EC (1.30 dS/m and 1.39 dS/m, respectively) were reported by the media garden soil: perlite: vermicompost @ 2:1:1 v/v before as well as after the end of the experiment.

The media combination of cocopeat: vermiculite: vermicompost @ 2:1:1 v/v recorded the highest water holding capacity before as well as after the end of the experiment (68.75% and 68.54%, respectively). Whereas, the lowest water holding capacity (43.72% and 42.26%, respectively) was recorded by media garden soil: perlite: vermicompost @ 2:1:1 v/v. The media analysis with respect to bulk density indicated that the minimum bulk density (0.58 g/cm^3 and 0.59 g/cm^3) was found in media peatmoss: vermiculite: vermicompost @ 2:1:1 v/v) before as well as after the end of the experiment. While, the maximum bulk density (0.89 g/cm^3 and 0.89 g/cm^3, respectively) was found in media garden soil: vermiculite: vermicompost @ 2:1:1 v/v at before and after the end of the experiment. The reason might be due to bulk density and water holding capacity measured by emptying the modular pots after the end of the experiment. This caused media to being loose.

Table 1: Effect of growing media on growth parameters of pothos (*Scindapsus aureus* L.) under modular biowall system

Treatment	Vine length (cm)	Number of leaves	Leaf area (cm^2)	Leaf length (cm)	Leaf width (cm)	Number of roots	Fresh weight of roots (g)	Fresh weight of shoots (g)	Dry weight of roots (g)	Dry weight of shoots (g)	Root: shoot ratio
M_1	15.04	5.13	21.31	7.44	5.20	7.25	2.18	7.90	0.17	0.70	0.24
M_2	19.22	5.84	23.50	8.23	5.44	9.60	3.76	10.46	0.30	0.96	0.31
M_3	20.13	6.43	24.66	8.36	5.61	11.00	5.28	12.12	0.41	1.08	0.38
M_4	22.70	8.34	27.64	8.90	5.71	12.00	6.60	13.74	0.47	1.14	0.42
M_5	20.78	6.72	25.67	8.48	5.63	10.50	5.15	13.10	0.40	1.11	0.36
M_6	19.64	6.18	24.20	8.27	5.49	10.20	4.61	11.29	0.36	1.02	0.35
M_7	18.41	5.85	22.94	8.16	5.36	8.70	3.27	10.16	0.25	0.93	0.27
M_8	16.90	5.61	21.81	7.90	5.27	8.55	3.32	9.56	0.24	0.90	0.27
SEm ±	0.23	0.10	0.43	0.11	0.10	0.43	0.19	0.36	0.01	0.03	0.02
CD at 5%	0.65	0.27	1.20	0.30	0.29	1.27	0.56	1.05	0.03	0.08	0.05
CV%	5.93	7.44	8.73	6.39	9.22	8.86	8.95	6.46	6.76	5.42	9.43

Table 2: Effect of growing media on quality parameters of pothos (*Scindapsus aureus* L.) under modular biowall system

Treatment	Visual quality (01-10)	Total chlorophyll content (mg/g)
M_1	5.18	0.301
M_2	6.15	0.330
M_3	7.09	0.428
M_4	7.87	0.466
M_5	7.53	0.453
M_6	6.32	0.425
M_7	5.55	0.417
M_8	5.31	0.394
SEm ±	0.10	0.003
CD at 5%	0.29	0.009
CV%	7.95	1.540

Table 3: Media analysis before and after the end of the experiment

Treatment	pH		EC (dS/m)		Water holding capacity (%)		Bulk density (g/cm^3)	
	Before	After	Before	After	Before	After	Before	After
M_1	7.11	7.19	1.30	1.39	43.72	42.26	0.80	0.81
M_2	6.99	7.12	1.26	1.35	44.89	43.66	0.89	0.89
M_3	6.64	6.71	0.46	0.58	61.53	61.12	0.59	0.59
M_4	6.68	6.73	0.60	0.73	68.75	68.54	0.66	0.68
M_5	6.34	6.50	0.36	0.54	64.97	63.12	0.68	0.69
M_6	6.19	6.34	0.32	0.44	67.22	67.16	0.58	0.59
M_7	6.91	7.05	1.23	1.30	54.21	54.08	0.70	0.71
M_8	6.97	7.10	1.24	1.32	51.24	51.10	0.68	0.70
SEm ±	0.12	0.11	0.02	0.01	0.84	1.08	0.01	0.01
CD at 5%	0.37	0.35	0.07	0.04	2.55	3.27	0.03	0.04
CV%	3.16	2.89	4.47	2.59	2.55	3.32	2.59	3.33

4. Conclusion

Based on the result obtained from the present investigation, it can be concluded that the soilless based media combination was found better than the soil-based media combination for pothos under modular biowall system. The growing media combination of cocopeat: vermiculite: vermicompost @ 2:1:1 v/v was found the best for pothos (*Scindapsus aureus*) which influenced the maximum growth and quality under the modular biowall system.

References

1. De-Rijck G, Schrevens E. Distribution of nutrients and water in rockwool slabs. Scientia Horticulturae. 1998;72(1):277-285.
2. Ikram S, Habib U, Khalid M. Effect of different potting media combinations on growth and vase life of tuberose (*Polianthes tuberosa* L.). Pakistan Journal of Agricultural Sciences. 2012;49(2):121-125.
3. Kavana GB, Chandrashekar SY, Hanumantharaya L, Salimath SB, Kumar PH. Effect of potting media on reproductive and quality parameters of *Nephrolepis undulata* J. Sm under protected condition. International Journal of Current Microbiology and Applied Sciences. 2019;8(8):1208-1215.
4. Kavipriya MV, Sankari A, Jegadeswari D. Studies on the effect of alternate media on growth of *Dracaena reflexa* 'Variegata'. International Journal of Current Microbiology and Applied Sciences. 2019;8(2):3394-3400.
5. Lakshanthi JMT, Seran TH. Survival rate and growth performance of in-vitro raised plantlets of orchid (*Dendrobium* sp.) in different hardening substrates. International Journal of Advanced Research and Review. 2019;4(3):1-9.
6. Mehmood T, Ahmad W, Ahmad KS, Shafi J, Shezad MA, Sarwar MA. Comparative effect of different potting media on vegetative and reproductive growth of floral shower (*Antirrhinum majus* L.). Universal Journal of Plant Science. 2013;1(3):104-111.
7. Monika KSY, Chandla A. Effect of different potting mixtures on growth and flowering characters of chrysanthemum cv. Haldighati. Flora and Fauna. 2021;27(1):20-26.
8. Mousa GT, El-Sallami IH, Abdul-Hafeez EY. Evaluation of certain potting media and NPK fertilizers for commercial production of pothos (*Scindapsus aureus* L.). Assiut Journal of Agricultural Sciences. 2004;35(1):258-275.
9. Nagavallemma KP, Wani SP, Lacroix S, Padmaja VV, Rao BM, Sahrawat KL. Vermicomposting: Recycling wastes into valuable organic fertilizer. Global Theme on Agroecosystems Report No. 8. Patancheru, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics; 2004. p. 1-20.
10. Pawar A, Salvi BR, Khandekar RG, Pawar CD, Salvi VG. Optimization of media for cut flower production in anthurium cv. Tropical Red. The Pharma Innovation Journal. 2022;11(4):629-632.
11. Pisa C, Parwada C, Chiripanyanga S, Dunjana N. Evaluation of vermiculite application rates on growth and yield of *Brassica napus* (rape). Science Heritage Journal. 2020;4(2):27-31.
12. Scagel CF. Growth and nutrient use of ericaceous plants grown in media amended with sphagnum moss peat or coirdust. Horticultural Science. 2003;38(1):46-54.
13. Swetha S, Padmalatha T, Rao KD, Shankar AS. Effect of potting media on growth and quality in *Aglaonema*. Journal of Horticultural Sciences. 2014;9(1):90-93.
14. Tomati U, Grappelli A, Galli E. The hormone-like effect of earthworm casts on plant growth. Biology and Fertility of Soils. 1995;5:288-294.
15. Younis A, Riaz A, Javaid F, Ahsan M, Tariq U, Aslam S, Majeed N. Influence of various growing substrates on growth and flowering of potted miniature rose cultivar 'Baby Boomer'. Current Science Perspective. 2015;1(1):16-21.
16. Zawadzinska A, Janicka D. Effects of compost media on growth and flowering of parviflorous garden pansy (*Viola* × *wittrockiana* Gams.). Acta Agrobotanica. 2007;60(2):167-171.