

Abstract No: BO-09

Formulation of novel organic liquid fertilizer for growth enhancement of ornamental cactus: *Opuntia microdasys* (Lehm.) Pfeiff

R. M. T. K. Ranathunga¹ and R. M. C. S. Ratnayake^{1*}

¹Department of Plant and Molecular Biology, Faculty of Science, University of Kelaniya, Sri Lanka
ratna@kln.ac.lk*

The ornamental plant industry is one of the world's most commercially significant plant-based industries. Among the ornamental plants, cacti are popular due to their attractive plant morphology. *Opuntia microdasys* (Lehm.) Pfeiff. is an expensive and popular house plant in Sri Lanka, and it is grown at large scales to fulfill the high market demand. Growers use excessive amounts of phosphorous-rich chemical fertilizers to enhance the growth of cacti, and they may cause both human and environmental health issues either directly or indirectly. This study aimed to formulate an organic liquid fertilizer (OLF) to provide nutrients for *O. microdasys* as an alternative to chemical fertilizers. Hence, the study evaluated the effect of a novel OLF and its optimum concentration for the growth performances of *O. microdasys*. To prepare the OLF, fresh *Tithonia diversifolia* leaves, dried cow dung, coconut husk ash, and powdered rock phosphate (1.5:1.25:1.25:1 ratio) were aerobically digested in well water (6.0 L) for six weeks at 27 °C. Same-sized, *O. microdasys* cladodes were grown in 5 cm diameter plastic pots (one cladode per each) containing cacti growth medium (coarse sand, river sand, and compost in a 4:1:1 ratio). One month after growth, *O. microdasys* plants were treated with 5%, 15%, and 25% of the concentrations of OLF once a week with 15 replicates. Chemical liquid fertilizer (CLF) "Lonzin" was used as the positive control, and well water was the negative control. Treated *O. microdasys* plants were arranged in a randomized block design in a plant house, and the pots were rotated clockwise every two weeks to obtain adequate sunlight. The growth performances of the *O. microdasys* plants were evaluated after six months by measuring the plant height, number of cladodes, cladode's length, width, and root length. All the data were subjected to the One-way ANOVA at $p = 0.05$ followed by Tukey pairwise comparison tests using the R statistical software. The lowest mean height (7.6 ± 1.0 cm), number of daughter cladodes (1.3 ± 0.8), root length (7.8 ± 1.9 cm), cladode's length (4.0 ± 0.8 cm), and cladode's width (2.7 ± 0.3 cm) of *O. microdasys* plants were recorded by the negative control. The growth performances of the *O. microdasys* plants under OLF treatments were significantly higher (One-way ANOVA, $p < 0.05$) than the CLF. Among the concentrations tested, the 5% OLF concentration significantly enhanced the plant height (12.7 ± 1.8 cm), number of daughter cladodes (3.6 ± 1.4), cladode's length (5.0 ± 0.8 cm) and cladode's width (3.6 ± 0.7 cm). Therefore, 5% OLF can be recommended as the optimum OLF concentration for the growth enhancement of *O. microdasys*.

Keywords: Aerobic digestion, Cactus, *Opuntia microdasys*, Organic liquid fertilizer

Acknowledgment

This work was supported by University research grant under the research grant no:RP/03/02/01/03/2020 of the University of Kelaniya, Sri Lanka.