

Application of Organic Matter with Biofertilizers to Restore Soil Fertility and Minimizing Environmental Hazards for Augmentation of the Flowering in Gladiolus

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ABSTRACT

Introduction: Gladiolus (*Gladiolus grandiflora* L) is a popular, economically valuable cut flower known for its long-lasting, elegant spikes, commonly cultivated for export, especially in winter (Virendra, *et al.* 2023). Effective cultivation practices, including timely planting, spacing, irrigation, and nutrient application, enhance flower quality and spike length. Excessive use of agrochemicals has led to soil degradation, prompting a shift toward organic farming (Anjaria, *et al.* 2024). Organic amendments like coconut coir and seaweed improve nutrient availability, soil fertility, and crop quality (Głab, *et al.* 2024), while eco-friendly biocontrol agents like *Trichoderma* and *Pseudomonas aeruginosa* help control fungal diseases and promote growth in gladiolus plants (El-Saadony, *et al.* 2022) (Yao, *et al.* 2023). In this research the outcome of soil modification with coconut coir and *Stokeyia indica* (a seaweed) was assessed alone or with biocontrol agents *Pseudomonas aeruginosa* and *Trichoderma harzianum* on the growth and flower value of gladiolus.

Objective:

- To restore soil fertility.
- Minimizing Environmental Hazards.
- Improve flowering growth of cut flowers.

Material and Methods: Sandy loam soil was mixed with coconut coir or seaweed (*Stokeyia indica*) at concentrations of 1% and 3% by weight, then placed into 5 kg earthen pots. Pots were watered daily for two weeks to allow for the decomposition of organic matter. *Pseudomonas aeruginosa* and *Trichoderma viride* cultures were prepared from the Karachi University collection, grown in King's B and Potato Dextrose broth, respectively. Three gladiolus seeds were sown in each pot, with microbial culture solutions (10⁸ cfu/ml) applied at 50 ml per pot.

Pots were settled using a randomized complete block design, with physical and biochemical parameters were collected after 90 days of germination. Data was investigated by One-way ANOVA followed by Least significant difference (LSD) assessment by using SPSS 16 (version 4).

Result: Treatments had momentous effect on leaves size, number of leaves, florets quantity per spike, corms quantity per plant, corm let's number per corm and shoot length. Number of flowers were found greater in number than control plants. Both seaweed and coconut coir amendment significantly improved vegetative growth of plants with increased number of flowers. *Pseudomonas aeruginosa* or *Trichoderma harzianum* also improved vegetative growth, flowering characteristics, corms production and biochemical contents in the leaves of Gladiolus plants.

Conclusion: Using coconut coir & seaweed alone and in combination with microbial inoculants as organic amendment recommended to improving growth of cut flower plants.

Keywords: Biocontrol Agents, Coconut Coir, Gladiolus, Soil Amendments, Vegetative Growth.

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