



The influence of endophytic actinomycetes spp. inoculation in rhizosphere soil on growth and yield quality of tomato



Jeeranan Khomampai¹, Nuttapon Khongdee², Thewin Kaeomuangmoon¹, Nakarin Jeeatid¹, Phanumat Ainta¹, Yupa Chromkaew^{1*}

¹ Chiang Mai University, Dept. of Plant and Soil Science, Thailand

² Chiang Mai University, Dept. of Highland Agriculture and Natural Resources, Thailand

* Corresponding author : E-mail yupa.c@cmu.ac.th

Background and objective

- Through the extensive usage of chemicals, tomato yields are significantly decreased. PGPR is an alternative that can help improve growth and yield quality of tomato production while using fewer chemicals overall.
- The present study aimed to determine the influence of endophytic actinomycete inoculation in rhizosphere soil on growth and yield quality of tomato.

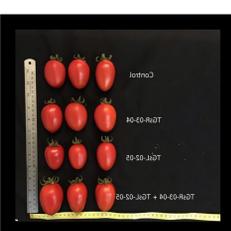
Material and Methods

1. Selecting two isolates of actinomycetes, *Streptomyces violaceorectus* (TGsR-03-04) and *Nocardioopsis alba* (TGsL-02-05), which have the capacity to produce IAA and dissolve phosphorus and potassium as well as act as plant growth promoting rhizobacteria (PGPR).



2. There were four treatments and three replications in the experiment, including (I) control, (II) inoculation with TGsR-03-04, (III) TGsL-02-05 and (IV) TGsR-03-04 with TGsL-02-05.

3. Inoculate actinomycetes with a spore concentration of 10^7 cfu/ml, 1 ml per plant at 15 days after planting seedlings and 10 ml per plant at 20 days after transplanting.



4. Colonization of actinomycetes into the root of tomato was analysed by Scanning Electron Microscopy. The height was measured at 14, 28, 56, and 112 days after transplanting (DAT) and final yield and yield quality was assessed at the maturity phase.

Results

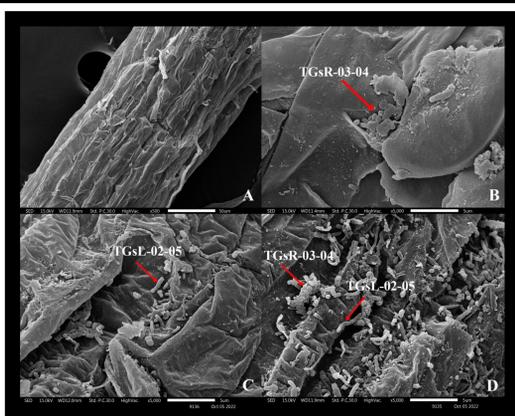


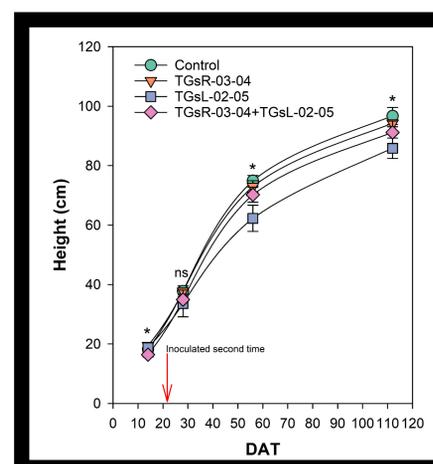
Figure 1. Colonization of actinomycetes into the root of tomato

Conclusions

- Endophytic actinomycetes potentially colonized in tomato root.
- TGsR-03-04 improves growth, yield quality and yield of tomato.
- Therefore, actinomycetes could be used as a bio-fertiliser in tomato production systems.

Results (cont.)

Height of tomato



At 14 days after inoculation, the tomato plant inoculated with TGsR-03-04 had the greatest height (19.40 cm) compared to the control.

Figure 2. The height of tomato at 14, 28, 56, and 112 DAT

Note: * = Significant difference at $P < 0.05$

Yield and yield quality of tomato

Table 1. Influence of endophytic actinomycetes spp. on yield and yield quality

Treatment	Total yield/plant (kg)	Fruit length (mm)	Weight/Fruit (g)
Control	1.45 a	51.46 ab	43.64 ab
TGsR-03-04	1.32 b	52.37 a	47.38 a
TGsL-02-05	1.47 a	48.74 b	41.86 b
TGsR-03-04 + TGsL-02-05	1.25 b	49.16 ab	41.88 b
F-test	*	*	*
cv	4.63	3.51	4.96

Note: * = Significant difference at $P < 0.05$

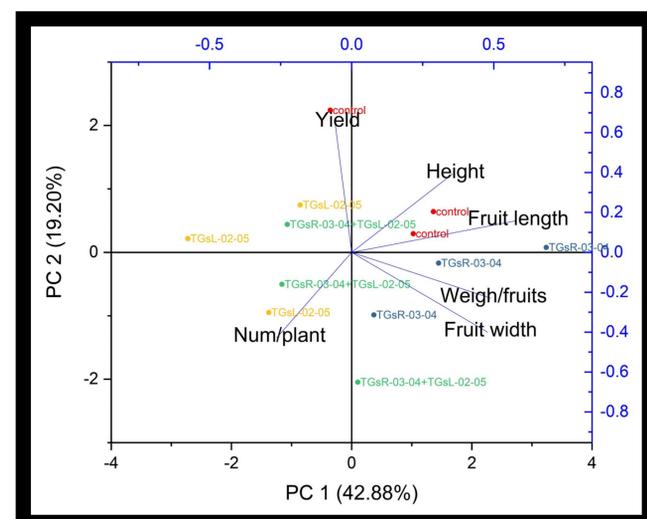


Figure 3. Principal Component Analysis (PCA) of yield and yield quality (height, fruit length, fruit width, weight per fruit, number per fruit) under difference inoculation with endophytic actinomycetes

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