

Title : Heat Tolerant Mechanisms and Growth-Promoting Potential of *Streptomyces thermocarboxydus* isolate S3 for Kale (*Brassica oleracea* var. *sabellica*) Cultivation

Author(s) : Ruksita Yawichai

Student ID : 640510340

Major : Microbiology

Advisor(s) : Assoc. Prof. Dr. Wasu Pathom-aree

Type of presentation :

- Oral Presentation
- Poster
- Cooperative Education

ABSTRACT

Streptomyces thermocarboxydus is a thermotolerant actinomycete with plant growth-promoting potential (PGPB). This study investigates the heat tolerance mechanisms of *S. thermocarboxydus* isolate S3 and its ability to enhance the growth of kale (*Brassica oleracea* var. *sabellica*) under high-temperature conditions. The experiment was divided into four parts: (1) evaluating the heat tolerance of S3, (2) studying its production of plant growth-promoting substances *in vitro*, (3) investigating potential of *S. thermocarboxydus* isolate S3 to promote growth of kale under heat stress, and (4) analyzing the whole genome for plant growth-promoting genes using the RAST annotation server. *Streptomyces thermocarboxydus* isolate S3 could grow at a maximum temperature of 45°C and promote kale growth under heat stress. Kale seedlings treated with S3 spore suspensions exhibited significantly higher growth parameters than the control group ($P < 0.05$) in terms of height (20.3 ± 1.2 cm), root length (23.6 ± 2.2 cm), and fresh weight (4.01 ± 0.4 g). *S. thermocarboxydus* isolate S3 reduced the accumulation of H_2O_2 in kale under heat stress. Furthermore, whole-genome analysis identified genes associated with heat tolerance and plant growth promotion.