Effect of PGPR-1 Biofertilizer on Germination and Seedling Growth of Sweet Corn under Temperature Stress Conditions

Suchada Boonlertnirun*

Faculty of Agricultural Technology and Agro-industry, Rajamangala University of Technology Suvarnabhumi, Phra Nakhon Si Ayutthaya, Thailand

Arunee Kongsorn

Faculty of Agricultural Technology and Agro-industry, Rajamangala University of Technology Suvarnabhumi, Phra Nakhon Si Ayutthaya, Thailand

Warakorn Ruankaew

Office of Agricultural Research and Development Region 5, Department of Agriculture, Chainat, Thailand

Abstract:

Seed germination and seedling growth are important stages affecting crop yield. However, extreme temperatures often inhibit germination and growth, preventing crops from reaching their full yield potential. Plant Growth-Promoting Rhizobacteria (PGPR) has been used to enhance seed germination and seedling growth under stressful environmental conditions. This research aimed to study the optimal methods and application rates of PGPR on the germination and seedling growth of corn under temperature stress conditions. The experiment was designed using a Split Plot in Completely Randomized Design, with the main factor being seed germination temperatures at three levels: 1) room temperature (25°C), 2) 15°C and 3) 45°C and sub-factor being method and rate of PGPR application at three levels: 1) no seed coating with PGPR-1 biofertilizer, 2) seed coated with PGPR-1 biofertilizer at 25 grams per 1 kg of seeds, left for 2 days before being sown, and 3) seed coated with PGPR-1 biofertilizer at 50 grams per 1 kg of seeds, sown immediately. The results showed that seed germination at room temperature resulted in the highest average germination rate, germination index, seedling height, and root length, with statistically significant differences compared to germination at 15°C and 45°C. For PGPR-1 biofertilizer application, seeds coated with 50 grams of PGPR-1 and sown immediately, as well as seeds coated with 25 grams of PGPR-1 and left for 2 days, tended to have the highest seedling height and root length, but these differences were not statistically significant from no seed coating with PGPR-1 biofertilizer. Additionally, no interaction effects were found between the germination temperature and the rate of PGPR-1 biofertilizer application on all traits studied.

Keywords:

PGPR- biofertilizer, seed germination, sweet corn, temperature stress.