



Microbial Seed Priming Enhanced the Germination and Early Seedling Growth of Sunflower

Nishma Pokharel^{1*}, Satishma Khatiwada¹, Abhisek Shrestha¹

Agriculture and Forestry University, Faculty of Agriculture, College of Natural Resource Management , Bardibas, Nepal

Abstract

Sunflower (*Helianthus annuus L.*) is a major oilseed crop valued for its high-quality edible oil, yet its productivity is often constrained by poor and uneven seed germination under field conditions. Bio-priming is an emerging and eco-friendly approach used to improve seed germination, seedling vigor, and overall crop performance. This experiment was conducted to evaluate the effect of bio-priming on germination and seedling growth of sunflower at Lab of College of Natural Resource Management, Bardibas, Mahottari during February-March, 2026. Modern dwarf variety was used in experiment using seven treatments (All microbes @10%, Azotobacter@10%, Beauveria@10%, cow urine@5%, Hydro-priming@10%, Metarhizium@10%, and Pseudomonas@10%) and four replications in Complete Randomized Design. The seeds were soaked for 12 hours in a priming solution and dried at room temperature for 2 hours. Germination diversity and growth parameter were collected and analyzed by Genstat ver 2015. The results revealed significant variation to all parameter except mean germination time. Seed priming with Azotobacter@10% resulted in the highest germination percentage (92.5%), mean leaf area (9.74 cm square), leaf area index (2.29), and seed vigor index-I (1061), while indicating superior seedling vigor and early plant growth. Metarhizium@10% produced the maximum root length (5.12 cm) and shoot length (6.93 cm), suggesting improved seedling development. Beauveria@10% showed the highest leaf number (4.10). However, cow urine@5% exhibited comparatively lower values for several growth parameters. Azotobacter@10% provides the most effective in improving germination and growth parameter and should be tested in large plot for validation.

Key Words: Bio-priming, germination, seedling, Sunflower, oilseed

