Technical Data Sheet

Penicillium bilaiae

Phosphate-Solubilizing Biofertilizer for Nutrient Efficiency & Crop Performance

Penicillium bilaiae is a beneficial soil fungus widely used as a microbial inoculant to enhance phosphorus availability, root system growth, and overall nutrient efficiency in cropping systems. Through the production of organic acids such as citric, oxalic, and gluconic acid, it acts as a soil probiotic to solubilize bound phosphorus from mineral and organic sources, improving plant access to this essential nutrient. P. bilaiae promotes early vigor, boosts phosphorus use efficiency, supports beneficial microbial interactions, and enhances long-term soil fertility in conventional and regenerative farming systems.

- Solubilizes bound phosphorus to improve nutrient uptake and reduce synthetic fertilizer use
- Promotes root elongation and seedling vigor under phosphorus-limited conditions
- Enhances nutrient efficiency and crop quality by supporting micronutrient and nitrogen uptake
- Works synergistically with mycorrhizal fungi and beneficial soil microbes
- Supports soil structure, organic matter cycling, and rhizosphere health

Technical Data

Concentration (CFU/g):
- 10 billion (1×10^{11}) CFU/g dry powder
- Custom concentrations available upon request

Particle Size (Mesh):
- Passes through 100 mesh sieve

Packaging Options:
- 22 lb (10 kg) pails
- 44 lb (20 kg) pails
- 340 lb (155 kg) drums
- Smaller custom packaging available on request

Shelf-life:
- 9 months at room temperature
- 18 months refrigerated

Storage Recommendations:
- Store in a cool, dry location away from direct sunlight.
- Reseal container tightly after each use.

Application Rates

Soil Application (Drip, Drench, or Fertigation)

Dosage:

- 400–1,200 grams per acre (1,000–3,000 grams per hectare)

Frequency:

- **Split** the above dose into 2–3 applications over the crop cycle

Soil Conditions Adjustments:

- Use lower rates (400–600 grams per acre / 1,000–1,500 grams per hectare) in high organic matter, moist, loamy soils
- Use higher rates (800–1,200 grams per acre / 2,000–3,000 grams per hectare) in low-fertility, dry, compacted, or sandy soils

Application Method:

- Dissolve thoroughly in waterEnsure enough dilution volume to fully saturate the root zone
- Use an agitation tank or manual stirring to maintain microbial suspension
- Apply through drip irrigation lines, micro-sprayers, or fertigation systems, positioning flow as close to the root zone as possible
- Flush the system after application to prevent clogging or residue buildup
- Do not tank mix with herbicides, fungicides, bactericides, or chemical pesticides

In-Furrow

Dosage:

- 2–4 grams per acre (5–10 grams per hectare)

Frequency:

- Apply once at planting to target root initiation and early growth stages.

Application Method:

1. Dissolve microbial powder thoroughly in water.
2. Apply directly into the seed furrow or planting trench at seeding time.
3. If using irrigation systems for delivery, ensure solution contacts the root zone.
4. Maintain agitation to prevent settling.

When tank-mixing with fertilizers:

- Dilute fertilizer fully in water first before adding Bacillus coagulans
- Do not mix with herbicides, fungicides, bactericides, or pesticides

Seed Treatment

Dosage:

- 2–5 grams per kg of seed

Frequency:

- Single application before planting

Application Method:

1. Apply immediately before planting
2. Use a sticking agent (e.g., sugar solution, gum arabic) or minimal water
3. Coat seeds evenly, ensuring full surface coverage
4. Allow seeds to dry gently in the shade before sowing

Soil Mix / Organic Matter Amendment

Dosage:

- 100–200 grams per ton of amendment, compost, organic substrate, or potting mix

Frequency:

- Single application when soil blending

Application Method:

- Evenly mix the dry microbial powder into the growing media during turning or mixing