

## 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 ( $1.0 \times 10^{10}$ ) 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
- 375 lb (170 kg) drums
- Smaller custom packaging available on request

**Shelf-life:**

- 6 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 water. Ensure 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

### 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

### 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

### 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

**Disclaimer:** Results may vary depending on environmental conditions, application rates, and management practices. The manufacturer makes no guarantee of specific results. Seller's liability is limited to replacement of product or refund of purchase price. Manufacturer is not responsible for misuse, mishandling, or application under adverse conditions beyond its control. This product is not registered for pesticidal use with the U.S. Environmental Protection Agency. It is intended as a soil amendment / microbial inoculant only. Keep out of reach of children.