



# RAPIDS®

Microbial activities in the soil play significant roles in enhancing plant growth and soil health through various processes. These include:

- ❖ **Phosphorus Availability:** Certain microbial strains can solubilize insoluble phosphorus, making it available for plant uptake.
- ❖ **Ammonification:** This process involves the conversion of organic nitrogen from plants or animals into ammonia, making it accessible to plants.
- ❖ **Increased Urease Availability:** Some microbes produce enzymes that catalyze the breakdown of urea into ammonia and carbon dioxide, further contributing to plant-available nitrogen.
- ❖ **Sulfur Oxidation:** This enhances sulfur availability in the soil, necessary for plant growth.
- ❖ **Nitrogen Fixation:** Certain microbes (Diazotrophs) convert atmospheric nitrogen into a form that becomes available to plants following the death of these microbes, aiding in plant nutrition.
- ❖ **Surfactant Production:** Some microbes produce biological surfactants that reduce surface tension, helping free up both organic and inorganic nutrients, making them more accessible to the microbial population. This process may also inhibit the growth of certain harmful fungi.
- ❖ **Nutrient Contribution:** The death of certain microbes releases vitamins and other nutrients beneficial for the growth of beneficial root community members.
- ❖ **Stress Resistance:** The production of ACC-deaminase by some strains lowers ethylene levels in plants, making them more resistant to various stresses.

- PHOS** | **STRAINS 06**  
Demonstrates the ability to solubilize insoluble forms of **phosphate**.
- AMMON** | **STRAINS 15**  
Identifies ammonifying organisms that can release **ammonia** from organic molecules.
- POTASSIUM** | **STRAINS 05**  
Demonstrates the ability to solubilize insoluble forms of **potassium**.
- ZINC** | **STRAINS 02**  
Demonstrates the ability to solubilize insoluble forms of **zinc**.

**STARCH** [strains 13] Able to produce the enzyme **amylase** to reduce starch to its monosaccharide subunits.

**PRO** [strains 11] Produce **proteinase** enzymes that can reduce proteins to their amino acid components.

**UREASE** [strains 06] Produce the **urease** enzyme that breaks down urea into ammonia and CO<sub>2</sub>.

**CELLU** [strains 11] Produce **cellulase** enzyme that can break down cellulose into its monosaccharide units.

**N<sub>2</sub>** [strains 07] Identifies **diazotrophs** with the ability to fix atmospheric nitrogen into ammonia.

**CHITIN** [strains 08] Produce **chitinase** enzyme that breaks down chitin into its n-acetyl glucosamine subunits.

**LIP** [strains 03] Produce **lipase** enzymes that can separate lipids into their fatty acid subunits.

**SIER** [strains 04] Produce **lipase and esterase** enzymes to disassemble and degrade lipids.

**IAA** [strains 07] Produces the hormone **indole acetic acid**.

**ACC** [strains 05] Able to degrade **1-aminocyclopropane-1-carboxylic acid**, helps prevent plant stress.

**ACE** [strains 07] Produces **acetoin**, enhances plant growth and resistance in plants against pathogens.

