Abnatura R&D

TECHNICAL NEWSLETTER

ABNATURA INC.

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THE RHIZOBACTERIA

The rhizosphere is the space immediately surrounding the roots of a plant where a complex series of interactions between the plant, microorganisms and the soil itself play out. This unique environment supports a microflora that includes both beneficial and pathogenic microorganisms and exerts a significant influence on the growth and productivity of plant cultures.

Among the many microorganisms in the rhizosphere, the plant growth-promoting rhizobacteria, or PGPR are a group of saprophytic bacteria (meaning that they are harmless, unlike bacteria classified as parasitic) that colonize the rhizosphere and promote plant health and growth.

In this issue

The Rhizobacteria : Probiotics of Plants

The range of known benefits provided by PGPR has grown in recent years. We now know that PGPR from the genus *Bacillus* benefit plants in several ways:

• **Increased bioavailability of certain essential elements:** For instance, iron chelation so that it can then be absorbed by the plant or phosphates to be solubilisation.

• **Fixation of atmospheric nitrogen:** Some PGPR are able to fix atmospheric nitrogen and transform it into organic nitrogen, which plants can then use.

• **Production of phytohormones:** Auxin and gibberellin hormones are produced by certain PGPR and directly stimulate plant growth.

Bacillus sp. PGPR types protect plants using several mechanisms of action:

• **Competitive colonization:** PGPR can colonize root surfaces, thereby preventing pathogenic microorganisms from infecting a plant.

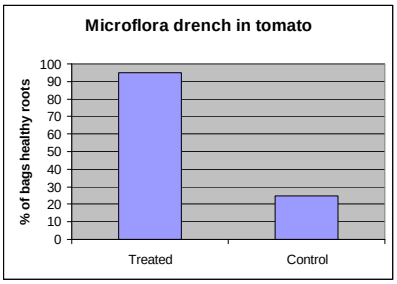
• **Antagonism via the production of antimicrobial molecules:** Many PGPR produce one or more molecules that fight off various bacteria and fungi.

• **Induction of immunity:** Some PGPR are able to stimulate plants' immune systems, making them more resistant to certain viruses, fungi and pathogenic bacteria. This characteristic is called ISR (induced systemic resistance).

• **Stress reduction:** Some PGPR produce enzymes that can alleviate several plant stresses, for example, high salinity and drought.

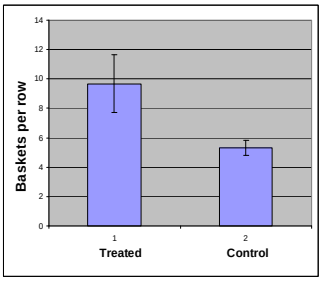
Effect of Rhizobacteria on Plant Growth

Bacillus sp*.: Improving of roots mass in tomato (6 root treatments every 2 weeks, 1.3L /Ha)

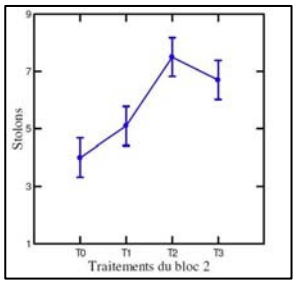


* mixture of pure strains

Bacillus sp.: Improving of yield in strawberry (drench-spraying every 7 days 5 times, 2L /Ha)



Bacillus sp.: Increasing of growth in strawberry (drench-spraying every 15 days, 1, 2 et 10 L / Ha, (T1, T2, T3))



Plant Protection Activity by Rhizobacteria

Bacillus sp.: 90% improvement of powdery mildew in cucumber (3 foliar treatments every 7 days)

Bacillus sp.: 90% improvement of *Cladosporium* in tomato (2 foliar treatments every 7 days)

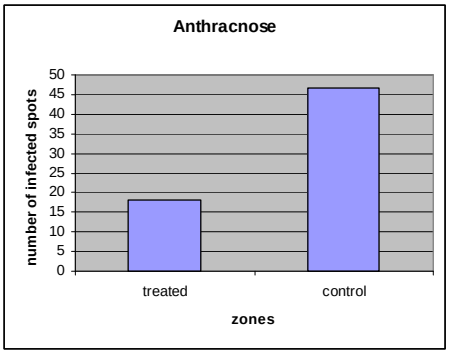
Bacillus sp.: 90% improvement of *Botrytis* in peony (3 foliar treatments every 3 weeks).

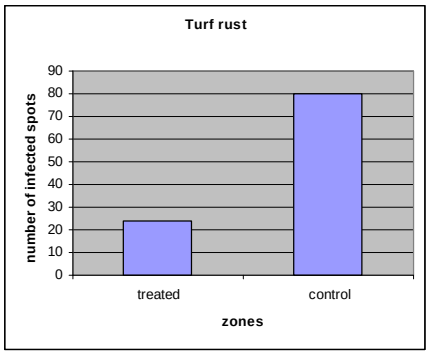
Turf Protection Activity by Rhizobacteria

Bacillus sp.*: 90% reduction of dollar spot on golf alleys (2 spray treatments every 30 days, 2L / Ha, preventive treatment).

* mixture of pure strains

Bacillus sp.: reduction of anthracnose and turf rust on professional sport turf (4 spray treatments every 7-10 days, 2L / Ha, curative treatment).





Effect of Rhizobacteria on Turf Quality

Bacillus sp.: Improvement of turf on non-irrigated overused sport turf (4 treatments, 2L / Ha).