

## Calkonutrium Microbial Information

Contains 90 billion of each microbial species.

Calkonutrium has two species : Bacillus Amyloliquefaciens and Trichoderma Asperellum.

Calkonutrium + has one extra species: Aztobacter.

### Bacillus Amyloliquefaciens

Rhizome bacteria with a strong plant root symbiotic relationship. It produces the enzyme amylase which turns starch into sugars. It quickly colonizes the plant root zone. Its main function is the production of an antibiotic called Plantazolicin. This is effective in killing or inhibiting the following microbes.

- Ralstonia (bacteria) – causes Granville wilt in tobacco and bacterial wilt in tomatoes and peppers.
- Pythium (parasitic oomycete) – causes rootrot, damping off and potato blight. It is a very hardy species transmitted by gnats. Spores can last years in the soil and is not destroyed by crop rotation.
- Rhizoctonia (fungi) – causes turfgrass disease(brown patches), bare patches in cereal crops and crown rot in beetroots. It also attacks the root and stem of seedlings.
- Alternaria (fungi) – found in a wide range of plants species including tomatoes, grapevines, strawberries and cereal grains. Optimal growth is at 25-30 degree's and stressed plants are more susceptible. Infected plants display concentric rings on their leafs. It also causes hayfever and asthma in human beings.
- Fusarium (fungi) – attacks wheat crops, especially if seasonal rains are late, through rootrot and seedling blight. It cost the US over \$3 billion over 5 years in lost wheat production. Destroying banana plantations in Panama with concerns it could spread worldwide.

### Trichoderma Asperellum

A fungus that lives within the plant in a symbiotic relationship. It is found worldwide, grows rapidly and prefers high temperatures. It enhances plant growth and resilience by increasing uptake of phosphorus, atmospheric Nitrogen and buffering plants against salt stress, drought and poor soils. It acts as an insecticide and herbivore by producing secondary metabolites that make plants unappetizing or toxic. It is very susceptible to destruction by fungicides and chemical fertilizers.

### Aztobacter

A very important Nitrogen Fixing Bacteria that forms strong walled nodules on the plants roots. It requires well aerated soils at a pH of 7-7.5 and a temperature around 20-30 degrees, it is not found in acidic soils. It facilitates mobility of toxic heavy metals and produces 0.01mg of Nitrogen per gram of glucose consumed. It is a hardy bacteria that can survive in a cyst form for up to 24 years.