



MIKRO-TEK INC.
MICROBIAL TECHNOLOGIES FOR THE ENVIRONMENT
AGRICULTURE • MINING • FORESTRY

The Technology

Mikro-Tek's technology utilizes specific strains of naturally occurring soil-inhabiting fungi, which colonize the root tissue of plants and form a structure referred to as mycorrhizae. The resulting symbiotic mycorrhizal association allows the host plant to increase moisture and nutrient uptake from the soil, which in turn results in increased plant growth and survival. Any increase in plant growth as a result of Mikro-Tek's technology carries a corresponding increase in [carbon sequestration](#).

Through photosynthesis plants remove carbon dioxide from the air, give off oxygen, and store the carbon as biomass. About one half of the dry weight of plant biomass is carbon, and one tonne of carbon in biomass represents 3.67 tonnes of atmospheric carbon dioxide.

[Canada's Climate Change Action Plan](#) has projected that international [carbon sinks](#) will provide Canada with emission reductions of up to 20 million metric tons of carbon dioxide equivalent (MtCO₂e) per year.

Mikro-Tek is providing an opportunity for industry to offset their carbon emissions and meet their Kyoto commitments by investing in a pool of aggregated sequestration projects in [Domestic Forestry](#), [Clean Development Mechanism \(CDM\)](#) Forestry, and [Reclamation/Agriculture](#).

Mycorrhizae: A plant's stress resistance can be increased to improve quality, and hence survival and growth, through the development of a symbiotic relationship with beneficial soil fungi, which colonize root tissue and form a structure referred to as mycorrhizae. The formation of mycorrhizae is considered essential for the survival and growth of the majority of plant species in natural ecosystems. Their role in enhancing water and nutrient uptake, especially phosphorus, zinc and copper, is well documented. Mycorrhizal fungi also influence plant growth through production of antibiotics and growth hormones and may deter root pathogens and protect roots in adverse soil conditions such as low pH and high soil temperature.

Research has shown that the type and amount of benefit a plant receives depends on the species and strain of mycorrhizal fungi with which it forms an association. There are literally thousands of species of mycorrhizal fungi, some showing little or no benefit to the plant. Mikro-Tek isolates beneficial strains of mycorrhizal fungi from plant communities that have naturally adapted to the specific soil and climatic conditions of targeted planting sites. These are cultured, mass-produced using fermentation or proprietary biomass production procedures, and inoculated onto the seedling's root zone in the nursery before out-planting, or directly into the seeding bed at the time of planting. This ensures establishment and functioning of the mycorrhizal association before the plant's exposure to pathogens, environmental stresses, poor soil conditions, and competing non-beneficial mycorrhizal fungi

Mycorrhizae can be classified into two primary types: ***ectomycorrhizae***, predominant in coniferous forest ecosystems (pine, spruce, fir etc.) and ***endomycorrhizae***, which form associations with broad-leafed trees (maple, ash, walnut etc.) and with most agricultural, nursery and horticultural crops. Endomycorrhizae are also known as *vesicular-arbuscular mycorrhizae*, *VA mycorrhizae* or *VAM*. This name comes from their characteristic fungal structures--vesicles (V) and arbuscules (A)--which form within the cells of the roots and act as the nutrient interchange points between the beneficial mycorrhizal fungi and the plant.

Mycorrhizae provide a natural, biological means of maintaining plant vigor, increasing the plant's resistance to soil-borne pathogens, and reducing the need for fertilizers and other chemicals. Countless experimental trials have shown that plants colonized by mycorrhizal fungi are generally larger, healthier and better able to withstand environmental stresses such as cold or heat, transplant shock, moisture excess or drought. In addition, mycorrhizae improve plant nutrition and therefore play a significant role in high yield crop production where environmental problems including soil erosion, soil depletion and water pollution with fertilizers, pesticides and animal wastes are a concern. Mikro-Tek's products, registered under the Fertilizers Act with Agriculture Canada, include MIKRO-VAM®, a mycorrhizal species that has a broad host range including most citrus, grain, and vegetable crops, bedding plants, grasses and deciduous trees, as well as MIKRO-CONE® for conifer species.