



## GREENHOUSE PROGRAM



- ③ At MTS Environmental Inc., we provide 100% natural solutions to agriculture, municipal, residential, recreational, and industrial organic waste and water environmental issues – with a radically different approach.
- ③ Nutrient contamination, odours, solid build-up, and soil borne diseases are not the problems – they are the symptoms of microbial and nutrient imbalance. This imbalance also makes crop plants more susceptible to disease and insect attack. Our products work to restore a natural balance of microbial life, activating the natural biodigestion system to eliminate the cause as well as the symptoms.

# BIO-DESOLVE GREENHOUSE PROGRAM

**Consists of two fundamental elements:**

- ⦿ Element One – Bio-Desolve Soil & Compost Enhancer
- ⦿ Element Two – Bio-Desolve Soil Carbon Mix

# ELEMENT ONE: BIO-DESOLVE NATURAL SOIL & COMPOST ENHANCER

- ⊙ An all-natural, environmentally friendly product used to control and treat disease-causing pathogens in the soil, and protect root systems, reducing disease pressure in crops.
- ⊙ Makes nutrients in the soil more readily available for uptake by plants, and supplies beneficial bacteria and microbes in the soil with a food source.
- ⊙ Naturally-occurring, microbial ingredients and liquefied carbons comprise the base - selected for their natural abilities to break down pollutants and improve water and soil quality.

# HOW BIO-DESOLVE NATURAL SOIL & COMPOST ENHANCER WORKS

- ① One of main ingredients is humic carbon
- ① Humic substances increase germination capacity of seed and vitamin content of plants
- ① Humic substances show a positive effect on micro-organism growth
- ① Humic carbons increase the permeability of the plasma membrane, resulting in increases uptake of nutrients by plants

# HOW IT WORKS

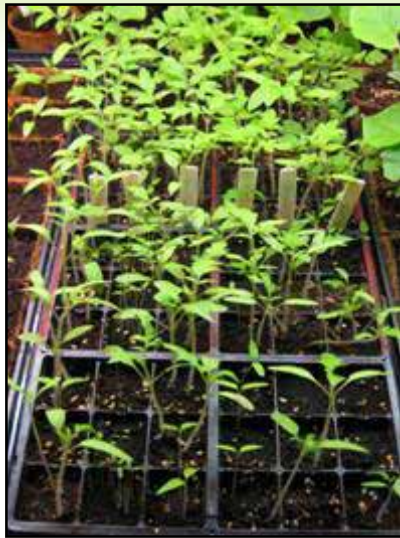
When humic carbons enter the plant at early stages of development:

- ⊙ enzyme systems are intensified
- ⊙ cell division is accelerated
- ⊙ root systems show greater development
- ⊙ yield of dry matter increases

# TOMATO SEEDLING PROGRESSION



Day 9 – top half treated (31 of 36 cells sprouted), bottom half untreated (20 of 36 cells sprouted)



Day 21 – top half treated (36 of 36 cells sprouted), bottom half untreated (29 of 36 cells sprouted)



Day 21 – left half untreated, right half treated



Day 27 – left half untreated, right half treated (number of cells sprouted unchanged)

# WATERMELON & CUCUMBER SEED PROGRESSION

Watermelon shoots 9 days after planting. Top two pots treated with Bio-Desolve, bottom two pots untreated.



Cucumber shoots 9 days after planting. Top two pots treated with Bio-Desolve, bottom two pots untreated.



Watermelon shoots 21 days after planting. Left pot untreated, right pot treated with Bio-Desolve.



Cucumber shoots 21 days after planting. Left pot untreated, right pot treated with Bio-Desolve.



# PLANTS ON LEFT WERE GROWN IN SOIL



- ◎ In all pictures, plants on left were grown in soil treated with Bio-Desolve Natural Soil & Compost Enhancer. Plants on right are untreated.
- ◎ Obvious increases in root mass are evident, which leads to taller, stronger plants above the soil.

# PROGRESSION OF TOMATO PLANTS IN GARDEN

Tomatoes treated with Bio-Desolve Natural Soil & Compost Enhancer



Same variety of tomato, left untreated





# ELEMENT TWO: BIO-DESOLVE SOIL CARBON MIX

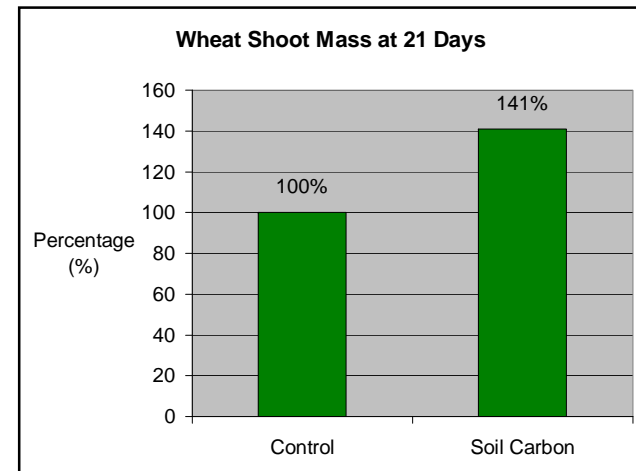
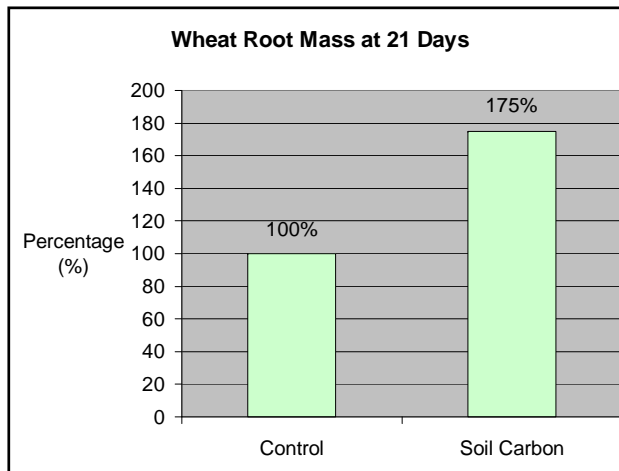
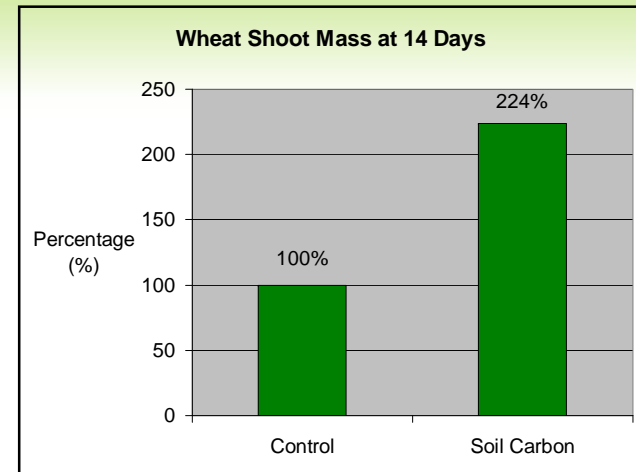
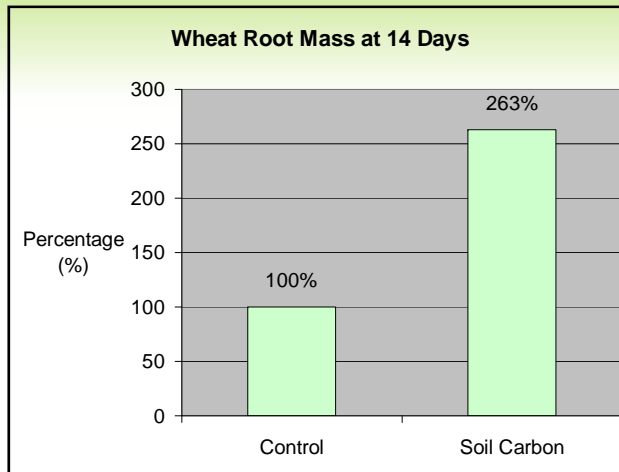
- ◎ A mix of humic carbon and bio-stimulant
- ◎ A simplified mix suitable for mixing with nutrient solutions
- ◎ Bio-Desolve improves nutrient uptake by the plants, which:
  - ◎ Reduces nutrient requirements by up to 2ppm
  - ◎ Reduces N requirements by up to 25%, limiting lush growth

# SIMILAR TRIALS THROUGH THE UNIVERSITY OF MANITOBA

Wheat plants were grown in growth chambers using products from MTS Environmental Inc.

Root and shoot mass was measured.

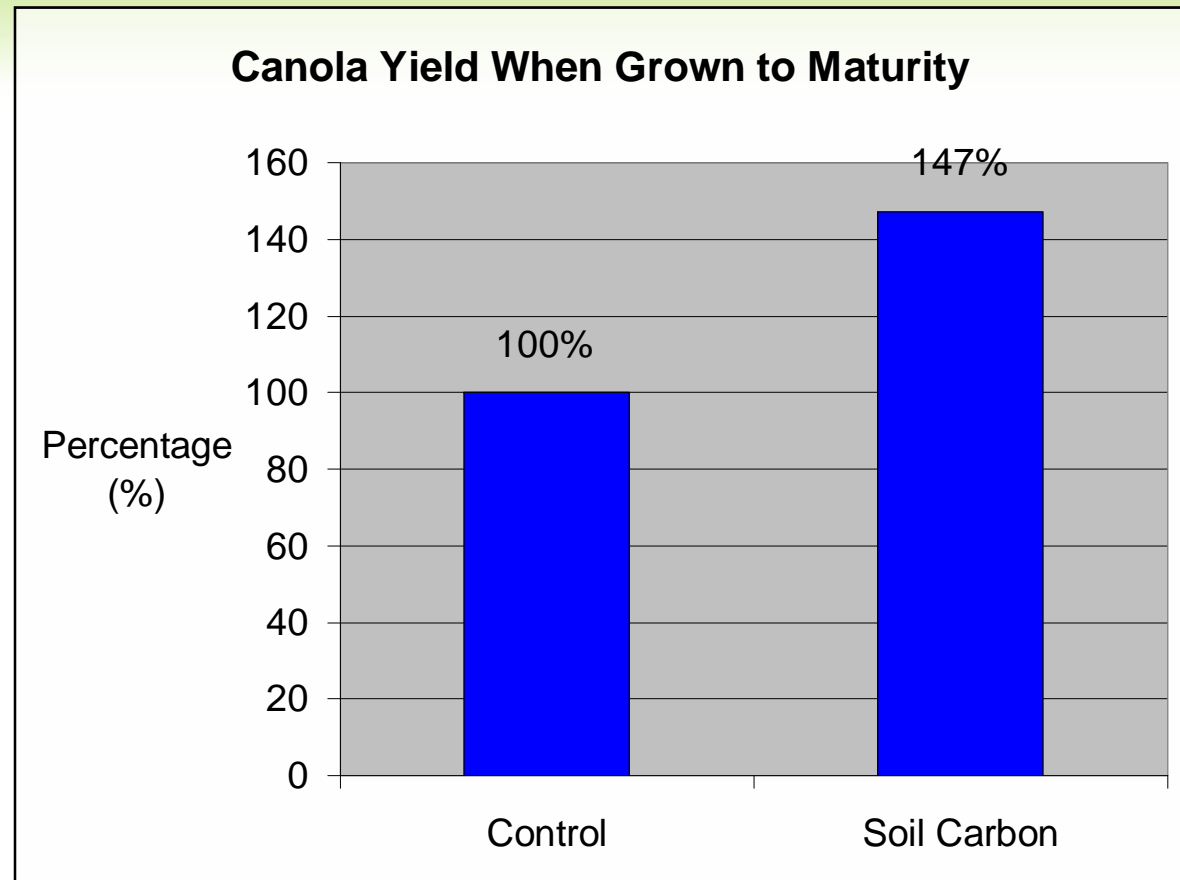
Note: all comparisons were done on a dry weight basis.



# INCREASE IN YIELD

During the same growth chamber tests as above, a limited number of canola plants were grown to maturity.

A dramatic increase in yield in the treated crop was observed.



# ADDED BENEFIT: INCREASES IN BRIX READINGS

- ⊙ Brix readings determine sucrose levels in plants
- ⊙ they indicate soil fertility needs
- ⊙ low Brix readings indicate the likelihood of bacteria, insect and fungal attacks in the crop
- ⊙ high Brix readings mean general immunity to the aforementioned problems
- ⊙ if soil nutrients are in the best balance, and made available to the plant by microbes, Brix readings will be higher and the crop healthier
- ⊙ carbon (main ingredient in Bio-Desolve) stimulates plant enzymes to produce sugars in the plant
- ⊙ liquid carbon is possibly the most powerful chelating agent known to man

Fruit	Treated	Treated	Untreated
Heirloom Tomato	13	10.5	7
Beefsteak Tomato	9	9	4

# SECONDARY APPLICATION: COMPOST

- ◎ Bio-Desolve Natural Soil & Compost Enhancer can also be applied to compost piles to aid in the breakdown of organic material, leaving the compost enriched with nutrients and beneficial soil life
- ◎ Bio-Desolve acts as a food source to keep existing microbes and bacteria healthy and growing.
- ◎ With higher numbers of microbes working and respiring in the compost, the temperature levels remain much more constant – even during the cooler months, allowing material to be broken down throughout the winter.
- ◎ Microbes present in compost need oxygen to break down organic materials. Without oxygen, composting can become very slow, and microbes can be killed. It is recommended to turn your pile, and maintain at least 35% moisture – watering the pile if needed.

# BIO-DESOLVE APPLICATIONS

## *Potting & Transplanting:*

- ⦿ 10 L Bio-Desolve per cubic yard of soil (mixed in 30 L of water)
- ⦿ 350 mL Bio-Desolve per cubic foot (28 L) of soil (mixed in 1 L of water)

## *Greenhouse Drip Lines:*

- ⦿ 2 mL Bio-Desolve per plant, added to the nutrient solution

## *Composting:*

- ⦿ 0.5 L Bio-Desolve per cubic yard of compost (mixed in 2.5 L of water)

## *Garden & Flowerbeds:*

- ⦿ 350 mL Bio-Desolve per 1000 square feet of soil (mixed in 2.5 L of water)

## *Lawn care:*

- ⦿ 10 L Bio-Desolve per acre of lawn (mixed in 100 L of water)
- ⦿ 230 mL Bio-Desolve per 1000 square feet (mixed in 10 L of water)

# SUGGESTED GREENHOUSE PROGRAM

- ③ Use Bio-Desolve Soil & Compost Enhancer when planting seeds or cuttings - 350 mL Bio-Desolve per cubic foot (28 L) of rooting medium (mixed in 1 L of water)
- ③ Add Bio-Desolve Soil Carbon Mix - Using 1 mL per plant added to nutrient solution during initial treatment, then increase to 2 mL per plant when nutrient solution is at full strength
- ③ At full strength, this will supply each plant with approximately 100 mg of humic acid per day

# WHY USE THE BIO-DESOLVE GREENHOUSE PROGRAM

- ⊙ Increase in yield expected; scientific literature suggests average increases of 25% in tomato production and 36% in cucumbers
- ⊙ Increase in germination capacity
- ⊙ Increase in uptake of nutrients by plant
- ⊙ Increase in root and shoot mass
- ⊙ Fruit with fewer blemishes, and sweeter in taste
- ⊙ Longer production from healthier plant
- ⊙ Disease suppression due to increased plant health
- ⊙ Small investment has the capability of large returns

# SUPPORTING REFERENCES

- ① “HS stimulated fruit yield in tomato plants. Total fruit yield per plant was 5 and 10% increased in plants treated with 5 and 50 mg/l HS respectively, compared to the yield of control plants. The application of HS affected positively also the yield of first quality fruits in both treatments, and was higher in plants treated with 50 mg/l HS.” *Acta Horticulturae*, vol.69
- ① “The beneficial effects of HS on both root and shoot growth under conditions in which a complete (optimal) nutrient solution (NS) are well documented (Chen et al., 2004). The data clearly show growth enhancement compared to pure water by additions of HA (50 mg L<sup>-1</sup>), and further stimulation of growth in Hoagland’s solution. The stimulation in the presence of HA exceeded that of Hoagland’s solution alone by ca. 25%, which provides evidence for a synergistic effect of combined applications of mineral nutrition and HS.” *Proceedings of the International Fertilizer Association’s Conference on Agriculture held in Kunming, China in March 2006*
- ① “A distinctive deficiency of many published reports on the effects of HS on plant growth stems is that researchers paid little or no attention to the concentration of the HS in the solution. Most of them employed a single concentration in their studies. A close examination of the data presented by Rauthan and Schnitzer (1981) showed, however, an optimum curve reaching a maximum at a range of concentration of 100-300 mg L<sup>-1</sup> HS in the NS for both the roots and shoots (Chen and Aviad, 1990).”



## GREENHOUSE PROGRAM



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