



# The program and the results of pilot study on the use of Bio-Organic Catalyst Phyto-Catalyst® for treatment of agricultural plants on the basis of JSC Agricultural Complex “Moscowskiy” Moscow Region, Russia

**1. Purpose of the study:** To verify the effectiveness of bio-organic catalyst Phyto-Catalyst® manufactured by Bio-Organic Catalyst, Inc. (USA) for agricultural crops (tomatoes and eggplants) in greenhouses of the JSC Agricultural Complex “Moscowskiy”(www.mosagro.ru), Moscow Region, Russia.

**2. Duration of the study:** July 6 - October 27, 2015.

**3. Basic information about Phyto-Catalyst®**

### **3.1 Applications and characteristics of Phyto-Catalyst®**

- ✓ Designed for bio-catalytic conditioning and optimization of transferring of nutrients in the soil;
- ✓ Improves the penetration of moisture and its retention in the soil;
- ✓ Increases the soil's ability to release nutrients;
- ✓ Helps increase the activity of indigenous microorganisms in the soil;
- ✓ Improves agricultural crops growth;
- ✓ Increases crop yields while reducing the consumption of organic or inorganic fertilizers.

Phyto-Catalyst® is a unique bio-catalytic product designed to improve the microbiological state of the soil and the transfer of nutrients to support an optimal growth of agricultural crops.

Phyto-Catalyst® consists of nutrient-rich composition for the growth of agricultural products with improved characteristics for the transfer of oxygen to improve the aerobic conditioning of soil and water penetration through layers of soil.

Phyto-Catalyst® improves the microbiological condition of the soil, whereby are improved the root growth and optimized crops' absorption of nutrients from the soil. The product improves fixation of nutrients, thereby reduces the need for fertilizers for grow of crops.

Phyto-Catalyst® increases the transmission of oxygen and prevents the growth of the biofilm. It makes this product useful for hydroponic systems, for care for the soil and water penetration.

### 3.2. Recommendations for use of Phyto-Catalyst®

Phyto-Catalyst® is dispensed at very high dilution via irrigation systems. For hydroponic and aeroponic systems, Phyto-Catalyst® is used in a ratio of 1 liter of the product to 400 - 500 liters of water once a week.

### 3.3. Specification of Phyto-Catalyst®

Phyto-Catalyst® is non-toxic, non-caustic, non-corrosive and safe to handle. The recommended shelf life is two years. The product can be stored at temperatures below 50 °C.

**Ingredients:** Water, bio-organic catalysts having high purity, produced from vegetable and mineral components, bio-surfactants.

**Warning:** Keep out of the reach of children. If the product from the package splashes into eyes, thoroughly rinse eyes with water.

## 4. The Program of Phyto-Catalyst® Testing

### 4.1. Tomatoes

Greenhouse №127. Eight coconut fiber mats with a total of 31 tomato plants (Hybrid X and Tamal) were given for the study. Out of eight total amount of mats, four mats (two mats with eight Tamala plants and two mats with seven Hybrid X plants) were treated weekly with bio-organic catalyst Phyto-Catalyst®. The greenhouse staff has conducted visual observation and comparative analysis of treated and untreated plants. Special marks applied on the treated plants by a marker made it possible to conduct a comparative analysis of the growth and condition of the treated and untreated plants after completion the study.

#### 4.1.1. Initial Data for Tomatoes Watering

Provided that Phyto-Catalyst® is applied by diluting with water to 400 times, and ten watering with an amount of 165 mL of water for each watering is conducted every day, it was necessary to prepare an irrigating solution of 15 tomato plants with Phyto-Catalyst® in an amount of:

- $(165 \text{ mL} : 400) \times 10 = 4.125 \text{ mL}$  per one plant per day (once a week).
- $4.125 \text{ mL} \times 15 \text{ plants} = 62 \text{ mL}$  of Phyto-Catalyst® for 15 plants once a week.

#### 4.1.2. The number of irrigation events with Phyto-Catalyst®

In the course of the study, it were conducted 16 irrigations of tomatoes with Phyto-Catalyst® in the following dates (D/M/Y): 07.07.2015, 07.13.2015, 21.07.2015, 29.07.2015, 08.05.2015, 08.10.2015, 17.08.2015, 24.08.2015, 31.08.2015, 09.07.2015, 09.14.2015, 23.09.2015, 05.10.2015, 12.10.2015, 10.19.2015, and 10.27.2015.



During the study, measurements were made of treated and untreated plants, vegetables weighing, counting vegetables with an apical rot (only for Tamala tomatoes, Hybrid X tomatoes are not subject to the apical rot).

## 4.2. Eggplant

Greenhouse №100 (row No. 5). Eight coconut fiber with two plants of eggplant on each mat were given for the study. Out of eight total number of mats, four mats (8 plants) were treated weekly with bio-organic catalyst Phyto-Catalyst®. Greenhouse staff has conducted visual observation and comparative analysis of treated and untreated plants.

### 4.2.1. Initial Data for Eggplants Watering

Provided that Phyto-Catalyst® is applied by diluting with water to 400 times, and ten watering with an amount of 165 mL of water for each watering is conducted every day, it was necessary to prepare an irrigating solution of eight eggplants with Phyto-Catalyst® in an amount of:

- $(165 \text{ mL} : 400) \times 10 = 4.125 \text{ mL}$  per one plant per day (once a week).
- $4.125 \text{ mL} \times 8 \text{ plants} = 33 \text{ mL}$  of Phyto-Catalyst® for eight plants once a week.

### 4.2.2. The amount of irrigation events with Phyto-Catalyst®

In the course of the study, it were conducted 16 irrigations of eggplant with Phyto-Catalyst® in the following dates (D/M/Y): 07.07.2015, 07.13.2015, 21.07.2015, 07.29.2015, 08.05.2015, 10.08.2015, 08.17.2015, 08.24.2015, 31.08.2015, 09.07.2015, 09.14.2015, 23.09.2015, 05.10.2015, 12.10.2015, 10.19.2015, and 10.27.2015.



During the experiment, measurements were made of the treated and untreated plants: number of flowers, a total number of vegetables, and the number of harvested vegetables.

## 5. The Results of the Study

The study results for tomatoes are shown in two tables in Attachment 1, and are compared with a control group of 16 plants (4 mats), planted in the same row as the group of treated tomatoes plants.

The study results for eggplants are shown in Attachment 2, and are compared with a control group of eight plants (two mats), planted in the same row as the group of treated eggplants.

## **6. Conclusions:**

### **6.1. Tomatoes**

The results specified in the tables of Attachment 1 indicate that use of Phyto-Catalyst® for tomatoes treatment allows achieving the followings:

#### **Hybrid X Tomato**

- The number of vegetables collected: + 30.5%
- The total weight of the vegetables collected: 16.5%
- The average weight of the vegetable: - 10.2%
- Productivity (the yield), kg/sq.m: + 15.9%.

#### **Tamala Tomato**

- The number of f vegetables collected: + 46.3%
- The total weight of harvested vegetables + 45.5%
- Number of vegetables with apical rot: - 46.9%
- The weight of the vegetables with apical rot: - 26.8%
- The average weight of the vegetable: + 5.6%
- Productivity (the yield), kg/sq.m: + 46.7%.

### **6.2. Eggplant**

The study results given in the table of Attachment 2 testifies to that use of Phyto-Catalyst® for eggplants allows to increase a number of harvested vegetables: + 27.7%.

## **7. Conclusion**

The use of Phyto-Catalyst® increases the yield of vegetable crops grown in greenhouses (tomatoes and eggplants) from 15 to 46%. The effectiveness of this product when it is used in the open field will be higher.

Phyto-Catalyst® may be recommended for permanent use in all greenhouses of JSC "Agricultural Complex "Moskovskiy".

### **Case Study Performed By:**

East Coast Distribution, Inc. (USA) - the exclusive representative of Bio-Organic Catalyst, Inc. (USA), manufacturer of Phyto-Catalyst® in the territory of Southern Eastern and Eastern Europe, CIS and Republic of Georgia.

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