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APPLICATION OF A SOIL BIO-INOCULATOR "GENESIS WITH SUMAGROW" IN MANGO CULTIVATION "Ataufu"

1.

Soil bio-inoculators are organic mineral or biological compounds produced from a fermentation extract prepared in multiple stages or by isolation and multiplication of microorganisms. The extract includes different species of bacteria and fungi belonging to different genera which are natural inhabitants of water and soil.
Bio-inoculators are very useful in bio-fertilization programs because they are the best tool to acclimatize new alternatives to chemical fertilization and reduce the emission of greenhouse gases generated by these activities. They are also becoming essential products for organic production since their use favors the environment of the soil, plant, microflora and edaphic fauna, which translates into a marked strengthening of the nutritional status of the plant allowing it to activate the systems of self-defense of the same, considerably reducing the harmful effect caused by pests.

2. OBJECTIVES.

Determine the increase of production in the crops treated with (Genesis with SumaGrow), this increase would be the result of the restitution of the natural mechanisms that the soil has to fix and solubilize nutrients through microorganisms, which will be used by the plant for its nutrition, besides benefiting the physical, chemical and biological condition of it.

3. THEORETICAL FRAMEWORK

Any agronomist will tell you that truly healthy soil will produce healthy and abundant plant life, without complete dependence on chemical fertilizers. The problem in most communities today is that continuous applications of fertilizers have destroyed the natural microbial activity in the soil, so it requires the use of additional fertilizers to provide nutrients to the life of the plants. Fertilizers in the soil are like steroids in humans: they have near-immediate and desirable results in the short term, but in the long term they can be very dangerous to your health. In the case of fertilizers, chemicals seep into groundwater and can leak into rivers, lakes, streams and oceans, much to the detriment of the water bodies and wildlife they support. Chemical fertilizers are very polluting. Due to this polluting effect, environmental regulations are increasingly stringent, related to the use of fertilizers and very punitive when a negative environmental impact is found.

The solution is to improve the health of the soil by adding a dose of microbial activity, thus remediating the soil even healthy state that supports the growth of plants without the dependence on chemical fertilizers. Our Genesis product with SumaGrow provides a highly concentrated,

patented blend of multiple naturally occurring soil microorganisms selected specifically for their ability to improve and rehabilitate the soil. No matter what the state of your soil, "Genesis with SumaGrow" will improve it.
How does it work? Microorganisms are a part of everything that lives. These help to digest food, contribute to the assimilation of nutrients in animals, in fact, each living being maintains a relationship with microorganisms at a very fundamental level. The microbiota in the soil increases nitrogen, phosphorus and the availability of micro - minerals in plants, they play a key role both in the production of vitamins and hormones of plants and in the inhibition of their pathogens. Without microorganisms, there would be no life. However, there are billions, perhaps billions of million species of microbes. There is nothing that happens on the planet with any living being that does not involve microbial activity. Therefore, not all of them work in harmony, so it is key to find genres that are not only compatible, but perform different functions on the ground. Researchers at Michigan State University were able to identify multiple of these soil microorganisms, and tested over a period of three years in more than 200 plots, it was shown that this unique combination of microbes is able to improve health and yield of any plant, from 25% to 400% - without fertilizer. It does not matter if you are growing fruits, vegetables, grass, flowers, cereals or legumes, the high microbial activity is the key to plant health and plant productivity.

4. EXPERIMENTAL DEVELOPMENT.

4.1. Test data.

The trial was carried out on the property of the company "RICABERTO" located on the Safando road, Cerecita sector, in the province of Guayas. The farm is dedicated to the agricultural production of different species of mangoes, mainly for export.
The trial lasted 99 days from July 8, 2014 to October 15, 2014. The following application schedule was made: • July 8, 2014 First application 810 ml. in 1080 m2 (54 plants) = 2 gallons / hectare • August 13, 2014 Second application 810 ml. in 1080 m2 (54 plants) = 2 gallons / hectare • October 15, 2014 Harvest 1 • November 04, 2014 Harvest 2 4.2. Experimental design. Completely Random Design: This design consists in assigning the treatments in a completely random way to the experimental units (individuals, groups, plots, cages, animals, insects, etc.). Due to its unrestricted randomization, it is convenient to use experimental units of the most homogeneous possible: animals of the same age, of the same weight, similar physiological state; plots of equal size, etc., in order to reduce the magnitude of the experimental error, caused by the intrinsic variation of the experimental units. This design is suitable for laboratory experiments, greenhouse, field crops, etc., that is, experimental situations as well as the environmental conditions surrounding the experiment. The variables under study are: V1 Fruit productionV2 Degrees Brix of the fruitV3 Acidéz of the fruitV4 Edaphic profileThe treatments under study are: FERTILIZERCHEMICAL GENESIS CONSUMAGROWT1 R1 - R2 - R3 100% NOT2 R1 - R2 - R3 50% applicationT3 R1 - R2 - R3 0% application 4.3. Measurement record.Table 1. Production of mangoes per treatment in kg.100% CHEMICAL 50% CHEMICAL + SUMAGROW ONLY SUMAGROWT1R1 T1R2 T1R3 T2 R1 T2R2 T2R3 T3R1 T3R2 T3R3 1st. 2nd 1st 2nd 1st 2nd 1st 2nd 1st 2nd 1st 2nd 1st 2nd 1st 2nd 1st 2da.1 11.5 23.5 1 13.5 29.0 1 22.0 22.5 1 10.5 28.0 1 20.5 30.5 1 15.5 25.5 1 8.5 21, 5 1 26 28.5 1 27 25.51 7.5 25.5 1 21.5 1 8.5 2 12.5 28.5 3 20.5 29.5 1 20.0 23.5 2 19.5 24.5 1 23.0 29.5 1 22.5 25.52 17,0 27.5 1 19.0 1 20.5 2 14.5 30.5 3 18.5 28.5 1 18.5 2 19.0 24.5 2 25.0 26.5 1 19.0 28.52 13.5 25.5 1 17.0 2 17.5 3 16.5 30.5 3 17.5 25.5 1 18 , 5 3 14,0 23.5 2 23.0 27.5 2 22.0 28.53 22.5 27.5 1 19.5 2 18.5 3 18.5

28.5 3 17.5 28, 5 2 25.5 3 22.0 22.5 2 22.5 28.5 2 23.5 30.53 22.5 28.5 1 17.5 2 25.5 3 16.0 25.5 3 19, 5 28.5 2 21.5 4 17.5 22.5 2 21.5 2 25.5 27.54 19.5 23.5 1 13.5 2 22.5 3 12.5 31.0 2 10, 5 28.5 2 21.5 4 18.5 18.5 3 23.5 2 23.5 4 18.5 2 20.5 3 18.5 4 24.5 25.5 4 17.5 25.5 2 25.0 4 20.5 18.5 3 25.5 3 24.5 5 12.5 2 20.5 3 20.5 5 10.5 28.5 4 21.5 2 16.5 4 20.5 21 , 5 4 27.5 3 22.5 6 15.5 2 22.5 4 23.0 5 16.5 30.5 4 19.5 2 21.5 4 13.5 4 25.5 3 24.5 2 21.5 4 21.5 5 13.5 29.5 4 18.5 3 18.5 4 23.0 4 25.5 5 23.5 2 15.5 4 20.5 6 17.5 5 19.0 3 20.5 4 6.5 4 23.0 5 23.5 2 19.0 5 13.5 6 18.0 5 18.5 3 16.5 5 13.5 5 18.5 5 21 , 5 3 13.5 5 13.5 6 18.5 5 16.5 4 21.5 5 8.0 5 25.5 5 24.5 3 15.5 6 16.5 6 15,0 5 21.5 4 18.5 6 21.0 6 25.5 6 21.5 3 20.5 6 19.0 6 21.0 5 19.5 6 20.5 3 12.5 6 19.5 5 18.5 6 20 , 0 4 14.5 6 21.0 5 15.5 6 15,0 4 18.5 5 19.5 27.5 4 16.5 6 25.5 5 20.5 6 20.0 6 20.0 6 16.0 160.5 181.5 373.0 29.0 301.5 22.5 235.0 316.5 338.5 225.0 454.0 49.0 245.5 197.5 361.0 140, 5 432.0 166.0 342.0 402.0 324.0 551.5 563.5 503.0 443.0 501.5 598.04.4. Results.Table 2. Increase of Production by treatments. Weight Treatment Total kg. Production increase in% T1 (100% Chemical) 1068.0 T2 (50% Chemical + GSG) 1618.0 51.5T3 (100% GSG) 1524.5 42.7 Table 3. Percentage of Brix Degrees in the fruit by treatments. Treatment Grades Brix% T1 (100% Chemical) 6,1T2 (50% Chemical + GSG) 6,8T3 (100% GSG) 6,3 Table 4. Percentage of Acidity in the fruit by treatments. Treatment Acidity% T1 (100% Chemical) 0,297T2 (50% Chemical + GSG) 0,349T3 (100% GSG) 0,339Table 5. Percentage of Organic Matter in the Soil (Pre and Post treatment) Organic Soil Matter% FINAL START1,5 2,74.5. Graphs 1. Graph 1. Total weight of the fruit by treatments. Graph 2. Variation of fruit production by treatments. Graph 3. Variation of brix degrees of fruit by treatments. Graph 4. Variation of the acidity of the fruit by treatment. Graph 5. Variation of the percentage of Organic Matter of the soil.

5. ANALYSIS AND DISCUTION.⁾⁾ It is evident that the results obtained (Table 2 and Graph 1 and 2), that the application of soil bio-inoculator (Genesis with SumaGrow) considerably increases the production of fruit per plant and therefore the amount of same per hectare. ⁾⁾ Table 3 - 4 and graphs 3 - 4 indicate that there was an increase in both the brix degrees as well as the acidity in the fruit. Definitely the highest level of brix degrees (sugar in the fruit) is desirable because it directly influences the flavor of the same making it more palatable. Regarding the increase in acidity, we are not aware of the final characteristics that can be modified in the fruit.⁾⁾ In table 5 and graph 5 we show that there is an increase in the amount of organic matter in the soil after finishing the treatment, this increase is of great importance, especially due to the very short duration of the trial (99 days). This increase is totally desirable since this is one of the most important factors in determining the productivity of the soil resource, especially in places where high temperature and humidity accelerate decomposition. The organic matter represents a basic strategy to give life to the soil, because it serves as food for all the organisms that live in it. Especially to the microflora that is responsible for carrying out processes of great importance in the dynamics of the soil, in benefit of the growth of the plants.

6. CONCLUSIONS AND RECOMMENDATIONS From the analysis carried out and the results obtained, it can be concluded that: • The objectives set for this practice are satisfactorily met, since the increase in production exceeded the expectations we had about the use of Genesis with SumaGrow in this type of crops • It is important to note that the increase in crop production was a reflection of an improvement first of the condition of the soil and then of the plant, which was verified with the results of the soil analysis. SumaGrow is a bio-inoculator of soils based on microorganisms and humic acids, so its contribution of nutrients to the plant is very limited. However, the results obtained are very encouraging both in forage production and in the reaction time of the soil to the product • The best production result was seen in the T2, which shows a double saving. First, by increasing production by 51.5% and second by decreasing the use of chemical fertilizer by 50% • T3 (100% Genesis SumaGrow) versus T1 (100% Chemical) shows an increase in production of 42.7% clearly showing the benefit of applying only (Genesis with SumaGrow) against traditional chemical fertilization • Based on what was written in the

previous point, a very important additional benefit that would be the production of crops emerges " Organic "using exclusively (Genesis with SumaGrow) that has an international certification (OMRI) that accredits it as an organic product and therefore can be used without any risk in their crops. Among the suggestions we can mention that: • Carry out the application of Genesis with SumaGrow in larger extensions for further evaluation in combination with chemical fertilizers as well as in Genesis exclusive applications with SumaGrow. Make a schedule of application of Genesis with SumaGrow considering the times of crop production • Use Genesis with SumaGrow in the nurseries and in the transplant of the seedlings to the field since the literature mentions an increase in the% of germination and decrease in the time of development of the plants.