MODALITIES FOR THE REHABILITATION AND REGENERATION OF THE USED CLAY SOIL FOR TOMATO CULTIVATION UNDER SCDL IERNUT CONDITIONS

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Abstract: In order to keep the most valuable good, the land, unpolluted, transformations are necessary for agriculture to become a biological, organic one. By properly applying organic fertilizers, soil properties are favorably influenced. Vegetable organic fertilizers are humus-generating. In this paper we tested various recipes of organic fertilization for tomato cultivation. The cultivation of tomatoes on exhausted compost from mushrooms compared with the control grown under normal conditions has made a significant contribution to the production per hectare. At the same time, the evolution of tomato production was studied by using different quantities of compost per hectare, which led to a quantitative increase in tomato production.

Keywords: organic fertilizer, fertilization, humus, compost, tomatoes

INTRODUCTION

In order to ensure the food needs of mankind - which is the main source of so many crises, including the food crisis, it is necessary to find efficient methods to increase the production, following both the defense and improvement of the land fund as well as the protection of the environment.

To keep the most valuable good -the earth- under high fertility conditions, the agriculture must become an organic one.

Under human action, the soil has undergone multiple changes, becoming to some extent a product of human labor. The proper management of the soil crops has a positive influence regarding porosity, permeability, water and air regime, and also on its microbiological activity.

Soil works performed incorrectly and improperly cause destruction or deterioration of the structure, which has repercussions on porosity, permeability, aerohydric and trophic regime.

Another influence on the soil is represented by the irrigation of the crops. A poor irrigation has negative effects on both the production and the soil, having as a result the removal of the land from the agricultural circuit. This could occur because of the salinization, alkalinization, marshing or erosion of the soil.

Even if chemical fertilizers and irrigation increase crops, insecticides and fungicides protect them, and herbicides significantly increase labor productivity, the soil becomes more and more affected: the biosynthesizing microflora is being deteriorated and the humus content depleted.

In addition, the acidity of the soil increases and the harmful concentrations of toxic substances like nitrates increase both in the soil and in the plant, therefore it is necessary to use organic fertilizers and amendments.

Through proper use of the organic fertilizers, the properties of the soil are being influenced.

Organic fertilizers in addition to the intake of nutritious substances contribute to the: intensification of the microbiological activity, restoring or maintaining the humus content and also improving the physical and chemical structure of the soil.

In addition to maintain and improve the clay-humic soil complex, applying organic fertilizers and amendments also leads to an increase in water retention capacity and to the restoration and reactivation of microorganisms life.

As protection methods for environmental protection, the local researchers have created varieties adapted to climate and soil conditions. Diseases, pests and weeds can be kept in place by crop rotation, proper application of soil tillage and crop maintenance and by the use of resistant varieties and hybrids.

The use of organic amendments has the following effects: the maintenance and improvement of the clay-humic soil complex, the stability and the increase capacity of water retention, as well as the restoration and reactivation of the life of microorganisms. Only organic ones are considered to be vegetal, these are also humus-generating.

The main organic amendments are: manure, a more or less fermented mixture of bedding and animal manure, artificial garbage, straw mixture and nitrogenous fertilizers with a certain fermentation stage, various vegetable composts from fungus, or others vegetable residues in which the peat does not exceed 30%.

To characterize all the amendments is important the knowledge of the ratio C / N (carbon on nitrogen) in %, which allows to be evaluated the rate of decomposition of organic matter (M. Dumitrescu et all 1998).

The working team of SCDL Iernut studied and tested various organic fertilization recipes for tomato cultivation.

The culture substrate can be made of different materials with a high content of cellulose or lignin.

The aim of this paper derived from the fact that the composition of the compost has a major contribution to the final results.

In order to obtain a high profitability regarding the cultivation of mushrooms, the quality of the compost is a determining factor that depends on the quality of the raw materials, on the compliance of the technology constraints and especially on the sterilization conditions.

The classic compost recipe is made up of 45% wheat straw, 45% corn cob and auxiliary grains like barley and calcium carbonate (As CO3).

The quality of the compost was verified in the research laboratory of S.C.D.L. Iernut, the compost being free from infections - molds.

The appearance of the compost prepared for mushroom cultivation are:
-chocolate brown color, pigmented in white-gray due to the presence of actinomycetes
- texture - straws become soft and break easily
- the pleasant smell of mushrooms, without the smell of ammonia

Characteristics - chemical composition:
-ammoniacal ammonia nitrogen free 0.01- 0.03%; total nitrogen - 1.8-2.2%; potassium: 1.2-1.5%; phosphorus 0.7-1.0%
-pH 7.3-7.5
-Humidity 67 - 68% N / C ratio: 1 / 18-1 / 20
-free of pathogens, nematodes, mites, molluscs.

By composting the straw, the cellulose and hemicellulose content is lower than in fresh straw, whereas proteins and lignin appear accumulated (Fig. 1)

MATERIALS AND METHODS

The technological steps that are being used are the following:

- chopping, crushing or grinding, homogenization (mixing), soaking or wetting, thermal disinfection, draining or squeezing the surplus of water, cooling, weighing, quality assessment and administering the amendment.

The milling, crushing or grinding is performed in different sizes (straw 2-3 cm.), chives and 0.5-2 cm tree bark, soybeans, beans, peas, rapeseed are crushed by a pitchfork.

These operations are recommended to be performed separately and not together.

The homogenization (mixing) is done after weighing the materials that will become part of the recipe. It will be considered that in order to obtain an amount of 100kg. cellulose substrate for sowing, is required approximately 30-35 kg of dry initial material.

Soaking or wetting: For small quantities of material the operation is performed in different vessels, basins, tubs, barrels, etc. For large quantities, the watering is done on a concrete surface, and the water is recycled and collected in a vessel. For this purpose the respective surface will have a slope of 2-3 degrees and at the base of the slope the water is collected to be recirculated.

Soaking time is maximum 24 hours, with the coating of some layers in thickness of 20 cm. It is not recommended to prolong the operation because there is a risk that the materials will fermentate.

Thermal disinfection: It aims to destroy harmful flora and fauna, it is mandatory and can be executed by three methods - directly on the flame, by boiling; with steam under pressure and with boiled water.

In the household system, for small amounts of substrate, disinfection is done with hot water at 80 degrees Celsius for 3-4 hours. Into the barrel at a height of 20-30 cm from the bottom, is placed a grid with thick mesh (on a tripod) and above the pre-

wetted material. Put water up at the height of the grid. This amount of water, by boiling, is transforming into steam that runs through the cellulose material throughout the height of the barrel.

From the moment you see steam coming out at the mouth of the barrel, time is being noted. It is thus kept on fire for 34 hours.

Large quantities of material (in the industrial system) are disinfected in a room specially arranged, with pipes with holes, through which steam is introduced below pressure. The material is soaked for 3-4 hours in advance (temperature steam will be around 80 ° C). After cooling and draining the excess of water, the material it is weighed to calculate the dose of the amendment and the dose of mycelium.

Before sowing, the cellulose material must have the following physico-chemical characteristics:

- pH - 3-5;
- water content 70-72%;
- total nitrogen 0.7-1.3 mg / 100 g s.u;
- no pests (mites, larvae, nematodes).

After applying the amendment in proportion of 5-6%, the pH of the material will be around 6.5-7 and humidity 65-70%.

The norm of mycelium at seeding is 3 kg / 100kg wet cellulose material.

Sowing is done by incorporating the mycelium into the substrate by mixing, taking care not to use the whole mycelium rule (an amount of 1/10, which will spread over the containers). The mixing operation between substrate, amendment and mycelium can be done in a bathtub wood with a capacity of 100 kg, or for small quantities, in a crate or directly on disinfected floor or polyethylene foil. The material containing mycelium is then distributed by hand, in different clean containers (bags, boxes, baskets etc.), in the amount of 8-10 kg / container and having an optimum thickness between 20 and 28 cm., maimum 30 cm. One-tenth of the surface of the bags is perforated with holes having a diameter of 1-2 cm, at a distance of 12-15 cm between them.

Above the container is placed an amount of about 20 g mycelium in order to observe the growth of the mycelium.

The remaining compost after the mushroom cultivation period, about 3 months was added as an organic fertilizer on the tomato culture.

RESULTS AND DISCUSSIONS

Tomato culture mixed with mushroom compost compared to control cultivated under normal conditions behaved better, bringing an increase in production of 39% compared to the witness. (table no.1)

There have been several variants of the amendaments used at the mushroom compost, as following (tabel nr. 2):

Tomato culture mixed with mushroom compost in different quantities compared to the untreated control it also brought a production increase of 30%

compared to the control, and the lands on which a larger amount of compost was used have a much more permeable texture.

CONCLUSIONS

The better development of tomato plants was due to the aero-hydric regime in the soil, meaning a better represented root system, more organic matter, that is, increased possibilities for humus formation, in general to improve all the physical, chemical and biological properties of the tomato. soil.

The compost from the mushroom culture caused the soil to be looser which led to a reduction in the water retention capacity in the soil and for this the tomato crop on this mixture had to be irrigated more often.

The use of this method of cultivation of tomatoes, in addition to the advantages obtained by obtaining higher yields, has substantially reduced the content in nitrates and nitrates of the fruit giving it a higher quality.

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