

# The Study on the Biology Formula Under All Nutrients Eco-organic Type Soilless Culture System

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## ABSTRACT

With the continuous development of the world's facilities, the level of control of the environment is increasing. China is the largest vegetable cultivation area, the traditional facilities of vegetable cultivation mainly use the soil within the facility, and in this cultivation mode, inevitably lead to even the occurrence of obstacles, such as soil salinization, soil disease aggravated. Soilless cultivation is an effective way to solve the soil continuous cropping obstacles. The soilless cultivation of nutrient solution as the main nutrient supply is limited by the large consumption of chemical fertilizers and the fear of food safety of cultivated crops, which leads to the development of this cultivation mode. And the application of organic materials based on the ecological use of substrate cultivation, more and more people's attention.

**Keywords:** soilless culture, organic material, matrix formulation, cucumber, tomato

## 1. INTRODUCTION

Studies have shown that the use of reasonable treatment methods can be agricultural organic waste compound for the production of vegetables suitable for the substrate, and can greatly reduce the consumption of fertilizer. In addition, China's agricultural organic waste is huge, the use of limited way, easily lead to environmental pollution. This study corn stalks, rotten cow dung, rice husk, slag and other organic waste as raw material, through microbial fermentation, on the basis of cucumber, tomato growth and development needs, mixture of different organic ecotype soilless culture substrate, cultivation of soil as the control (CK), different formula of cucumber, tomato growth, yield and quality. And system to detect the different formula of matrix during the process of cultivation of physical and chemical properties change, in order to select suitable for the growth of the cucumber, tomatoes organic ecotype soilless cultivation substrate, all nutrients for greenhouse vegetable production safety and the ecological use of agricultural organic waste to provide theoretical and experimental basis [1].

### 1.1. Related Work

This experiment adopt the method of slot culture, cucumber, tomatoes each preparation five matrix formula, cucumber cultivation matrix formula for S1T1, S1T2, S1T3, S1T4, S1T5, tomato cultivation

matrix formula for S2T1, S2T2, S2T3, S2T4, S2T5. The results of physical and chemical properties of the substrate, growth index, physiological index, quality and yield were analyzed and the results were as follows:

(1) Compared to five cucumber cultivation matrix formula, S1T4 and S1T5 were the best treatments, and the order of yield was: S1T5 > S1T4 > S1T1 > CK1 > S1T2 > S1T3, S1T5 treated cucumber yield in the early stage or the whole harvest period were the highest, S1T4 treatment followed, the two treatments were significantly higher than the control. The growth rate of the growth potential was higher than that of the control and other groups. The difference between the root vigor and the control at the end reached a significant level. And S1T4, S1T5 two treatments in all periods are satisfied with the growth and development needs of cucumber. Among them, S1T2, S1T3 treatment in the detection of indicators, were lower than the control, and the early delay of seedlings is difficult to consider the practical application.

(2) Compared to five tomato cultivation matrix formula, the best comprehensive S2T2, S2T3 two processing, production scheduling, in turn, is: S2T3 > S2T2 > S2T4 > S2T5 > CK2 > S2T1, S2T2 processing tomato is highest in the early, can create more economic benefits, S2T3 processing throughout the harvest time of the highest yield, S2T2 treatment followed, the two treatments were significantly higher than the control. The growth rate of the growth potential was higher than that of the control and other groups. The difference between the root vigor and the control at the end reached a significant level. And S2T1, S2T3 two treatments at all times are satisfied with the growth

and development needs of tomatoes. Among them, S2T1, S2T5 treatment in the detection indicators, were lower than the control, and the early delay of seedlings is difficult to consider the practical application [2].

### **1.2. Our Contribution**

With the development of facility gardening in the world, more and more people demand the controllable level of facility environment[1]. With the vigorous development of horticultural industry, the area of protected vegetable industry in China ranks first in the world, and a large proportion of the facilities are cultivated in soil. The unscientific use of chemical fertilizers and pesticides by agricultural workers has led to serious obstacles to continuous cropping of soil and even serious problems of vegetable food safety [3]. As a result, the researchers solved the problems caused by facility gardening by soilless cultivation. At present, soilless cultivation is one of the important means to solve the obstacle of continuous cropping in facilities. Its main advantage is that it has fundamentally resolved the main problems embodied in the greenhouse as a production site at present, that is, soil-borne diseases and insect pests and barriers to continuous cropping. However, the traditional soilless cultivation of the corresponding equipment investment is high, the technical system is complex. At present, the technical quality of agricultural labor force in our country is relatively low, so it is difficult to master this technology, which makes its popularization in our country limited. It is an effective means of popularizing facility agriculture technology to study a kind of cultivation method with low investment in cultivation technology and relatively simple technique. Therefore, in order to popularize soilless culture better organic ecotype soilless cultivation plays a key role. Organic ecotypic soilless cultivation refers to a new green soilless cultivation technique which does not grow in soil but uses substrate, and uses organic solid fertilizer instead of traditional nutrient solution to irrigate plant roots, and directly irrigates with clear water. So organic ecotypic soilless cultivation can improve the yield and quality of horticultural crops, reduce the use of chemical fertilizers and pesticides, ensure the cleanliness and hygiene of products, and is also outstanding in saving water, saving fertilizer and saving labor. It can also produce horticultural crops and so on in non-tillable soil, at the same time, it can simplify the management and operation mode of tedious soilless cultivation[2]. On this basis, if the cultivation substrate can be fully nutritioned, the popularization and application of this technique will be greatly accelerated [5].

### **1.3. Paper Structure**

As a major agricultural province in Heilongjiang Province, according to incomplete statistics, the total amount of straw used in Heilongjiang province is more than about 50000000 tons every year, but its actual utilization is less than 20 million tons, and the total amount of waste in the breeding industry is up to more than 300 million tons. Thus, it can be seen that the resources of agricultural organic waste in Heilongjiang province has a huge space. More than 60% of them are directly burned by farmers, and livestock manure is directly applied to farmland without treatment. Even the waste of resources is also a damage to the environment. is a nutrient rich in the growth and development of large quantities of plants in these abandoned materials. The processing of the organic material can not only make the waste resources, but also protect the environment, and promote the sustainable development of the agricultural and forestry industry. It is feasible to apply it to the soil free cultivation matrix through rational scientific combination, and it is important to ensure the safety and sustainability of the green food and vegetable production by Therefore, it is of great significance to combine the abundant agricultural organic wastes in Heilongjiang and the organic ecotype cultivation matrix to promote the sustainable development of agriculture.

In this experiment, the Organic Ecotype Soil free cultivation technology and the related theory of static soil free cultivation are combined to develop an organic ecotype total nutrient free culture matrix formula which can be used in the production of facilities in the facility vegetable production. In the process of vegetable production, the amount of chemical fertilizer is of great significance. The results of this study can provide a more convenient and easy to master cultivation mode for the Organic Ecotype Soil free cultivation technology, which can better promote the efficient and high quality production of the horticultural crops, reduce the soil free cultivation and reduce the land and reduce the labor force. The economic and ecological benefits are improved.

The main raw material of vegetable soil free cultivation matrix is organic material and inorganic material. The selection of material is the first consideration of material price, variety, sustainable utilization and environmental protection. Heilongjiang is a big agricultural province. According to incomplete statistics, the total amount of straw can be collected and utilized by more than 50 million T every year in Heilongjiang Province, and the actual utilization is actually used. Less than 20 million T, and the total amount of waste in the aquaculture industry is up to more than 300 million T, most of which are in idle state. However, more than 60% of these agricultural wastes are directly burned by farmers, and the livestock have not been directly applied to farmland[4]. This is not only a great waste to the resources but also a great

damage to the environment. Therefore, it is of great significance to combine the large amount of agricultural organic wastes in Heilongjiang and the soil free cultivation of vegetables to promote the sustainable development of agriculture. so that it cannot only solve the problems of traditional cultivated gardening in soil, but also play a role in the reuse of agricultural waste and the protection of the environment.

## 2. BACKGROUND

However, although soil free cultivation has solved many difficulties for facilities gardening, there are still some problems in its own. At present, there are many kinds of substrates in use in our country, the sources of material resources are different, the physical and chemical properties of the matrix have no unified standard, more requirements are required, and some disinfection treatment is needed. The treatment and disinfection of the matrix after use are also complex. These problems are the main problems to restrict the promotion and application of the matrix. At the same time, this is a high requirement for the professional quality of the managers. The management personnel need to master the related agricultural production technology, and master certain vegetable physiological and biochemical knowledge and electronic computer technology. At present, agricultural producers are rather complicated and difficult to master.

In the study of the amount of fertilizer applied in the process of vegetable crop cultivation, the typical results were as follows: the results of the study on the suitable fertilizing amount of Li Xiangyun, such as Li Xiangyun, cucumber, eggplant and sweet pepper, showed that N, P 2 O 5, K<sub>2</sub>O suitable dosage, tomato were 0.2,0.4,0.2 kg/m<sup>3</sup>, and cucumber was 0.8,0.2,0.1kg/m<sup>3</sup>, respectively. The eggplant was 0.8,0.4,0.2 kg/m<sup>3</sup>, and the sweet pepper was the result of the suitable fertilization amount of watermelon such as 0.4,0.4,0.4 kg/m<sup>3</sup>. Chen Siming, respectively. The amount of chemical fertilizer = (1.5 times the target yield of the watermelon, the effective component in the organic matrix) / the nutrient absorption rate in the chemical fertilizer (N, P, K absorption rate was 60%, 30% and 70% respectively).

The suitable amount of fertilizer applied to muskmelon by Gao Junjie was found that the suitable amount of fertilizer for melon in spring was = (the required fertilizer for the melon target yield, the quick nutrient in the organic matrix) / the nutrient absorption rate of the fertilizer (N, P, K, respectively 60%, 30% and 70%), and the suitable fertilizer amount for melon in autumn stubble = (1.5 times the target yield of melons - organic matrix) Medium speed effect component) / nutrient absorption rate in chemical fertilizer.

## 3. CONCLUSION

According to the background of the development of facility horticulture, it is very important to develop organic ecotypic total nutrient culture substrate in order to popularize facility horticulture and make more agricultural producers accept facility gardening. Organic ecotypic total nutrient culture substrate is based on organic ecotypic culture substrate, adding all kinds of nutrient elements needed for plant growth period, through auxiliary materials, A new type of cultivation method with no topdressing or as little topdressing as possible was realized in the period of plant production, which was matched with a suitable management technology model. It has the advantages of labor saving, fertilizer saving, energy saving, reuse of agricultural waste, convenient management and so on[5]. With the completion of the human genome project, the development of large-scale bioassay technologies such as genomics and proteomics, and the wide application of other high technologies in the biological field, biomedical research is facing unprecedented opportunities. At the same time, the high complexity of biological system is still a great challenge for us. At present, it is urgent to link up the "gap" fields of biomedical research, and the work in these fields cannot be completed by one Institute of n1h alone. Only a combination of multiple institutes and disciplines can exert the greatest impact on medical research[6]. So what are the most pressing challenges? What are the obstacles to progress? What must we do to overcome these obstacles? What cannot be completed by a single institute, but by the strength of NH as a whole? In May 2002, the new director of NH, Dr. zeihun, held a meeting immediately after a week in office to explore the answers to these problems and solutions.

After a series of discussions by more than 300 authoritative people from academic, industrial, government and social circles from 2002 to 2003, the NH roadmap was gradually formed, which was composed of 28 subprogrammes of three themes (exploring new approaches, future research team and rebuilding clinical research system). In order to support the implementation of the roadmap, NH allocated 129 million US dollars in 2004 and 2.1 billion US dollars in 2009, all of which come from the respective research funds of NH Research Institute and center. For the first time in history, every institute and center is willing to raise money for the NH roadmap.

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