



Study on the Ecological Circulation Agricultural System of Combining Planting and Raising of Berry Tea

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ABSTRACT

Berry tea is a perennial vine. Its scientific name is *ampelopsis grossedentata*. It belongs to vitaceae and is widely spread in the Tujia people of Xiangxi, Hunan Province. By adopting appropriate agricultural planting technology, rational use of organic selenium fertilizer and nutritional conditioner, we can produce high-quality berry tea with more healthy and even medicinal value and high selenium content, and realize double protection of human health with high selenium content and high flavonoids. Under the existing planting system, through the supplement of breeding links, constructing ecological recycling agricultural system combining planting and raising, not only can greatly enrich the supply of table agricultural products, but also can effectively ensure the high quality and high safety of agricultural products, and can effectively enrich the local agricultural industrial structure.

1. Brief Introduction to the Basic Situation of Berry Tea

Berry tea is a perennial vine. Its scientific name is *ampelopsis grossedentata*. It belongs to vitaceae and is widely spread in the Tujia people of Xiangxi, Hunan Province, and has a history of more than 700 years of use^[1]. It is a traditional and national medicinal and edible plant, which can be taken orally and externally. Berry tea contains 17 kinds of amino acids necessary for the human body such as leucine, isosine, methionine and 14 kinds of trace elements such as potassium, calcium, iron, zinc, magnesium, especially rich in highly active flavonoids and dihydromyricetin^[2,3].

Berry tea is called “mold tea” because the cells are broken during the processing and the flavonoids contained in the cells penetrate to the surface to form a layer of “hoarfrost”, resembling white mold, so it is called “mold tea”. It was renamed “Berry Tea”, with the beautiful and poetic meaning and essence of nature.

It has been tested and identified by 16 national medical authorities that the plant contains a natural plant cream whose active ingredients are mainly flavonoids, containing 12.8~13.8 flavonoid crude protein, the average content of total flavonoids is $\geq 6\%$, and the highest detected content is 9.37%. It has the highest content of flavonoids in all plants found so far, so it is called the “king of flavonoids”.

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Flavonoids are called “vascular scavengers” by the medical community. They have great effects on preventing cardiovascular and cerebrovascular diseases. However, the metabolism of flavonoids in the body is very fast, and the human body cannot synthesize it by itself, so it needs to be taken from the outside frequently^[4,5]. And berry tea is therefore also called the “King of Tea”.

The flavonoids contained in berry tea can sterilize and anti-inflammatory, clear heat and detoxify, relieve pain and swelling, moisturize the throat and relieve cough, reduce lipids and blood pressure, and improve the body’s immunity. It is useful for treating upper respiratory tract infections and chronic pharyngitis, bronchitis, and regulating the gastrointestinal tract. Berry tea can also effectively discharge harmful acid peptides and ketones in the human body, discharge blood scales, regulate blood lipids and blood pressure, soften blood vessels, regulate renal tubular reabsorption, and improve sleep. Frequent urination, can inhibit platelet aggregation, anti-thrombotic and anti-tumor, and have obvious therapeutic effects on neurological diseases^[6].

The flavonoids contained in berry tea can sterilize and anti-inflammatory, clear heat and detoxify, relieve pain and swelling, reduce blood lipids and blood pressure, moisten the throat and relieve cough, regulate and improve human immunity. It has a strong ability to kill staphylococcus aureus, Streptococcus A/B, dicoccus pneumoniae and influenza bacillus, etc.^[7,8]. According to the identification of the national authority, berry tea contains high flavonoids and has a wide range of uses. It can be used to extract pharmaceutical products and benefit all mankind. The relevant departments and experts of this project are studying and entering the clinical trial stage.

The main area of the Hunan berry tea planting is located in the natural selenium-rich soil belt of Hunan Province, but the natural selenium content of the soil is mainly in the form of mineral selenium. The organic selenium content in the soil is relatively low, and the amount that crops can be absorbed, transformed and enriched is also relatively low, so there are still fewer agricultural products that meet the national selenium-rich standard, and the selenium-rich berry tea is relatively rare. By adopting appropriate agricultural planting techniques and rational use of organic selenium fertilizers and nutritional conditioning agents, high-quality berry tea with high selenium content with more health and even medicinal value can be produced, and the human body health protection with high selenium and high flavonoids can be achieved.

Under the leadership and support of Hunan Provincial Department of Agriculture and Rural Affairs, Hunan Academy of Agricultural Sciences and Zhangjiajie Municipal Gov-

ernment, researchers took samples and inspected the berry tea test base in Fuping Village, Sangzhi County, Zhangjiajie City. The total flavonoids reached 2.83%, the content of Dihydromyricetin is as high as 41.4%, and the selenium content is as high as 0.39 mg/kg. The overall quality is very good, and it has great market prospects and competitiveness.

2. Shortcomings and Deficiencies of the Current Industry Status

2.1 The single industry restricting the potential for economic development

The berry tea-producing area in Hunan has a good natural ecology in the countryside, with beautiful scenery, and it has the potential and characteristics to develop the function of agricultural ecological consumption. However, through investigations, it is found that these places are generally planted with a single structure and cannot provide sufficient supply of high-quality and abundant edible agricultural products. This is very unfavorable for the development of the rural ecological consumption industry. The single berry tea planting and processing industry is not enough to cultivate and build the attractiveness of customers’ short-term leisure and even permanent residence. This will severely restrict the space and stamina for further development of the local economy. In addition, the sale of a single agricultural product is also difficult to further expand the overall economic scale of the local area.

2.2 Wasting resource and affecting environmental quality

The planting area of berry tea in Hunan Province has expanded year by year, and the total area has reached hundreds of thousands of mu (a unit of area, =0.0667 hectares). The total amount of residues after the normal harvest of berry tea each year is cumulative. These residues, such as the old yellow leaves and pruning branches after autumn frost, still contain very high flavonoids and other precious substances, which are also very precious resources. However, these resources are discarded as waste and have not been properly developed. Many of them are directly used in the natural environment, causing relatively serious damage to the natural ecological environment, affecting the quality of the ecological environment of the production area, and also a huge waste of resources.

3. The Advantages and Necessity of Building an Ecological Recycling Agricultural System around the Berry Tea Industry

With the development and growth of the berry tea in-

dustry and the rise and rapid development of the cultural tourism and health care industry closely integrated with it, there will be a large number of waste resources, such as berry tea leaves, kitchen wastes, human and animal excrement. The total amount of these waste resources increases with the development of the entire industry. If these waste resources are not properly treated, they will inevitably cause huge damage to the entire ecological environment. But if handled properly, they are also valuable resources. And building an ecological recycling agricultural system happens to be the best way to turn these resources into wealth.

3.1 Enriching the industrial structure and improving the quality of agricultural products

Cultural tourism & healthcare agriculture with leisure functions is inevitably an agricultural system with multi-product output, and can meet the diverse needs of customers that a single planted product cannot meet.

Under the existing planting system, by adding the breeding process, not only constructing an ecological recycling agricultural system combining planting and breeding can greatly enrich the supply of agricultural products on the table, but also because the inherent technical system of ecological recycling agriculture eliminates the effects of fertilizers, pesticides and various hormones, while adopting the principles and methods of Chinese medicine to prevent and control various diseases, effectively ensures the high quality and high safety of exported agricultural products, and can effectively enrich the local agricultural industry structure.

3.2 Realizing resource recycling and exerting resource value

A large amount of organic perishable wastes will be produced in agricultural production and human life activities. If these wastes are not treated properly, they will bring great threats and serious damages to the natural ecological environment. If these waste resources are to be treated, the best treatment is the as the agricultural production resources. The organic waste resources eventually return to the soil, which is extremely important for maintaining the balance of soil fertility, minerals and organic matter. The construction of an ecological recycling agricultural system can realize the recycling of these wastes and the recycling of agricultural resources. This is the only way to perfectly solve this problem.

At the same time, resource conservation and resource regeneration and recycling are also inevitable require-

ments for the construction of ecological civilization and the transformation and development of the national economy to a low-carbon economy or even a zero-carbon economy under the conditions of the new era.

3.3 Comprehensively improving the quality of the ecological environment

Clear water and green mountains are wealth. The beautiful ecology of the countryside is undoubtedly the lifeline of a new type of countryside. All waste resources generated by agricultural production and human activities must be recycled and utilized. This has become a rigid requirement, and thus building an ecological recycling agricultural system has become an objective necessity.

Perishable organic waste such as human and animal excrement and kitchen wastes are piled into fertilizer, and then returned to the soil as fertilizer for crop planting. This recycling method of waste resources is one of the essences of human farming civilization for thousands of years. With the development of modern technology, this resource recycling approach has been almost completely cut off, which is one of the main causes of many problems such as the gradual degradation of soil in recent years, serious soil compaction, decreasing organic matter year by year, imbalance and even local scarcity of soil trace elements.

With people's awakening of ecology and increasing attention to health and wellness, the healthy and back-to-nature agricultural production model has received increasing attention from all aspects. The return to historical farming culture has also become the internal driving force for the new development of agriculture. The ecological recycling agriculture combining planting and breeding is a very important practical carrier for the return of farming civilization.

3.4 Realizing industrial revitalization and economic development

The ecological recycling agricultural technology system combining planting and breeding is a production system and an industrial system at the same time. It includes agricultural product planting, livestock and poultry breeding, feed processing, fertilizer processing, resource recovery, resource regeneration, product packaging, warehousing and logistics. The establishment of a recycling agricultural system can promote the revitalization and development of a rural industry, and is an effective way to solve the inherent contradiction between rural ecological environmental protection and social and economic development.

4. The Basic Mode and Basic Principle of Ecological Recycling Agriculture Based on The Cultivation of Berry Tea

4.1 Basic mode

Following the basic principles of ecological recycling agriculture, through the integration of microbial engineering, mechanical engineering, construction engineering, plant repellent and physical prevention and control engineering, resource recovery and regeneration engineering and other multi-disciplinary professional technologies, a new type of ecological cycle agricultural technology system of micro-low two-level biotransformation is innovatively proposed on the basis of upgrading the original classic “pigs & biogas & fruits” model, taking the continuous conversion of material and energy in the system is used as the concept. The system has advanced technology, high material and energy conversion efficiency, thorough resource conversion, higher grade of renewable resources, and better ecological benefits.

Combining the actual situation of the berry tea planting industry, the future industrial development planning and positioning, the consumption habits of the Chinese people and the unique characteristics of the berry tea plant source, this paper determines to use the model of berry tea & pigs & laying hens combination to build an ecological recycling agricultural system. This kind of planting and breeding mode is in line with the basic principles of resource regeneration and utilization, and its realization technology is basically mature and feasible. The basic

structure of this mode is shown in Figure 1:

4.2 Basic principle

The basic technical scheme of the combination of planting and breeding in this paper is composed of two core transformation links: liquid single-stage microbial transformation and solid microbial two-stage biological transformation. After biological transformation, the manure produced by the breeding system is transformed into excellent organic fertilizer for the planting system. The planting system has obtained an excellent and sufficient fertilizer source, which can produce a large number of plant products, combined with the large amount of low-grade animal protein (black soldier fly) produced by the solid waste biotransformation process. After being processed into feed, it can provide abundant feed resources for the breeding system. In this way, the materials in the entire system continuously circulate, so that the resources can be continuously regenerated and utilized, thereby eliminating the pollution of the ecological environment, saving resources, reducing production costs, and achieving the purpose and effect of pure organic and true green planting and breeding, thereby ensuring the high quality and high safety of the products. The basic principle of the system is shown in Figure 2:

The resource circulation of the system is shown in the figure below. Since the output of harmful factors in the ecological environment is prohibited, the system also ensures the health and safety of the ecological environment from the source.

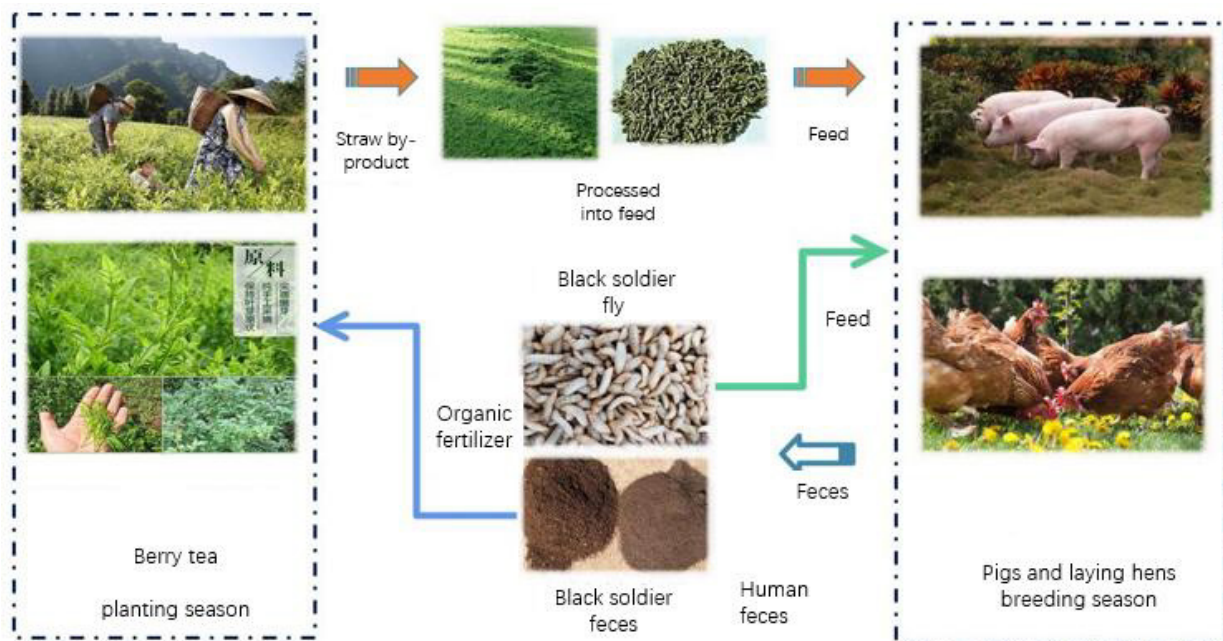


Figure 1. Basic structure of ecological recycling agriculture based on berry tea cultivation

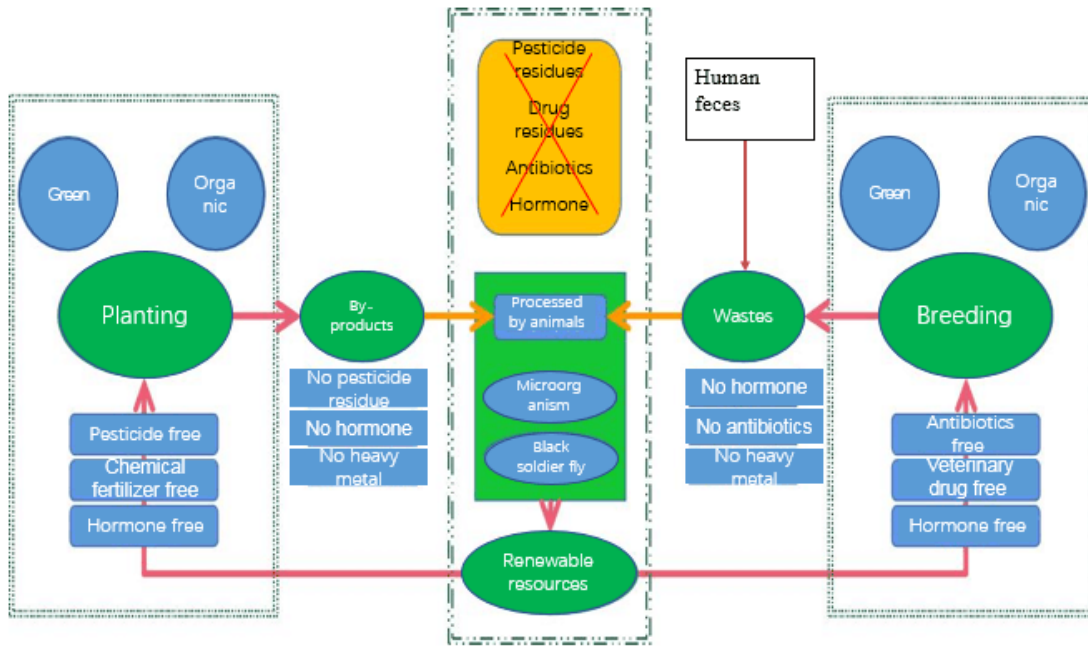


Figure 2. Basic principle of ecological recycling agriculture based on berry tea cultivation

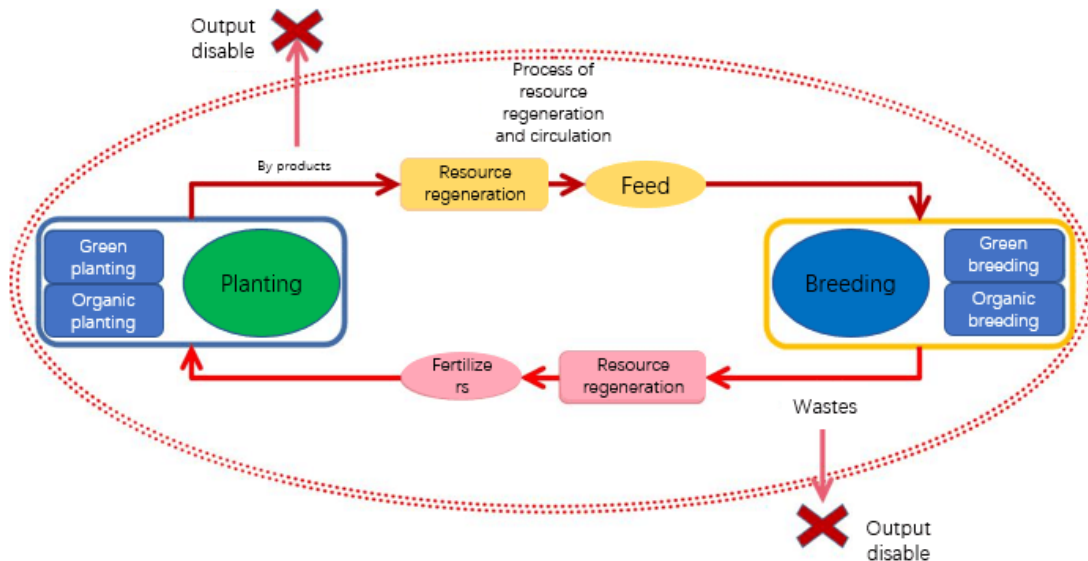


Figure 3. Resource circulation flow of ecological recycling agriculture

5. The Core Technology of Ecological Recycling Agriculture

In order to ensure the health and safety of the ecological environment, all waste resources generated by agricultural production and human activities must be reasonably transformed and fully utilized, otherwise these wastes will threaten and destroy the health and safety of the environment.

In order to ensure the health and safety of exported agricultural products, it is necessary to strictly follow

and adopt the green standards stipulated by relevant national departments during the entire production process of agricultural products, and adopt a variety of scientific and effective measures and methods to ensure the entire process of agricultural production from the source. Green standards can be achieved economically.

Both the health and safety of the ecological environment and the health and safety of agricultural products are the biggest livelihood needs of the people in today's new era. The only agricultural production mode that can perfectly unite the two and achieve both is ecological re-

cycling agriculture. Only ecological recycling agriculture has both the inherent power and the technical ability to realize the above two guarantees.

5.1 Green planting technology

Green planting and breeding technology requires that healthy, sustainable, and environmentally friendly planting and breeding techniques are adopted in the planting and breeding process, with no use of all non-green chemicals, preparations and fertilizers during the planting and breeding process. The basic principles of carbon and zero emissions ensure the healthy growth of animals and plants, and reduce or even completely eliminate the negative impact and damage to the natural environment.

According to our traditional Chinese medicine thinking and theory, a healthy environment is a prerequisite to ensure the healthy growth of people, animals and plants. Therefore, starting from the environment, conditioning and repairing the environment is a key link to ensure the realization of green planting and breeding. "Planting before controlling the soil, breeding before controlling the houses", which emphasizes the importance of environmental management to achieve green planting and breeding.

Green planting technology starts with the soil treatment for planting, increasing the content of soil organic matter, supplementing the beneficial microbial flora, regulating the content of soil mineral elements, and enhancing the activity of a variety of soil enzymes to ensure the healthy growth of plants and enhance their disease resistance and stress resistance.

According to the traditional Chinese medicine philosophy of "more emphasis on prevention than treatment", in order to overcome the impact of plant diseases and insect pests, we should base our efforts on prevention and response. Combining the biological characteristics of the corresponding planted crops, local native plant communities and insect communities, local natural and geographical climatic conditions, formulate corresponding prevention and control measures and time plans to prevent pests and diseases, and use microbial fertilizer and microbial bacteria strictly on time and quantitatively. Chemicals are used to prevent pests and diseases and promote growth of crops, and use nutrient element fertilizers to promote growth and strengthen seedlings of crops, so as to effectively improve the immunity of crop plants. For various insect pests, a multi-pronged combination strategy is adopted for comprehensive prevention and control: frequency-vibrating solar insecticidal lamps are used throughout the year to kill adult insects, effectively reducing the number of harmful adults; insect sex information

disrupting hormones are used to interrupt the reproduction chain of harmful insects during the pest breeding season; the organic silicon is used to dissolve the epidermis of waxy surface insects to make them dehydrated or infect bacteria to be kilt; metarhizium anisopliae and beauveria bassiana are timely used to spray the whole garden two to three times a year. The comprehensive use of these measures can effectively prevent the occurrence of various pests.

The idea of "more emphasis on prevention than treatment" is a very effective way of ensuring the quality of agricultural products and reducing the cost of agricultural production. It must be strictly implemented in the entire process of agricultural production.

Green breeding technology starts with the treatment of the breeding house and its surrounding environment. Keeping the ecological environment around the house beautiful, clearing the weeds and trees in the park, removing the accumulation of debris in the house, cleaning up the garbage and dust, keeping the environment clean and tidy, promoting ventilation and reducing the habitat and breeding of mosquitoes and pests can greatly reduce the probability and ways of disease transmission and infection. Reasonably planning roads and plant repellent isolation zones in the breeding farm can isolate and drive away harmful mosquitoes and other small animals from spreading. A high-pressure spray system is arranged in the farm and house, and the environment is regularly sprayed to eliminate pests and supplement the beneficial microbial flora that can promote the health of the animal body, maintaining the balance of the micro-ecological environment in the park, and reducing the risk of disease.

The breeding houses are generally in a state of high-density breeding, and the breeding animals live under high-intensity environmental competition. In addition to effectively reducing the health and safety risks of the entire environment, it also enhances the individual animal's physical fitness and enhances its disease resistance and immunity. It is another important way to ensure the health and safety of individual animals.

Still following the traditional Chinese medicine theory of "more emphasis on prevention than treatment", in the process of animal feeding, just like regulating the health of humans, properly add proprietary Chinese medicine ingredients that can enhance physical fitness in the animal's drinking water and feed, or add appropriate ingredients. The plant-based raw materials of traditional Chinese medicine components are used to prevent diseases, enhance physical fitness and early treatment of diseases, thereby eliminating the abuse of various veterinary drugs, hormones and antibiotics, and ensuring the health and safety

of aquaculture products.

In addition, according to the principle of nutrient absorption and enrichment by animals and plants, it is possible to deliberately customize the production of planting products according to the local resource endowment conditions. For example, berry tea scraps and its stalks can be used to be processed into feed materials. This feed is often used to feed pigs and laying hens to obtain meat and egg products containing high flavonoids. This product can improve human immunity, reduce cardiovascular diseases, and has huge benefits for eliminating other sub-health diseases. The emergence of this product has a huge promotion effect on the local health care industry, and this high-quality functional product will surely become another beautiful logo in the local area.

5.2 Customized production technology of selenium-enriched agricultural products

Berry tea has the well-known good health care and even medicinal value. Selenium also has extremely high value for human health care. If the two can be integrated into the same agricultural product at the same time, the health value of the agricultural product will be very high.

Selenium is a food-derived antioxidant that can scavenge excessive oxygen free radicals in the human body and prevent the destruction of cell membrane lipid peroxidation. It can improve the body's overall immunity and has the function of assisting in cancer prevention and anti-cancer. Sufficient intake of selenium in the human body can reduce blood lipids, blood pressure, prevent atherosclerosis, reduce thrombosis and reduce the area of myocardial infarction; it can prevent liver viral diseases, cirrhosis, liver cancer, fatty liver, alcoholic liver and other diseases. Selenium has a function similar to insulin in the human body and can activate pancreatic islet cells to work normally. For men, selenium can improve the local anti-infective function of the prostate, control inflammation, and control hyperplasia; selenium can prevent male infertility and female infertility, enhance the body's anti-allergic, improve the anti-allergy, anti-aging and anti-virus ability, can inhibit virus mixing and reduce lipoplaque formation, beautifying the features, protecting eyesight, removing garbage from the body, expelling toxins from the body, and removing heavy metal toxins. Selenium can prevent Keshan disease and Kashin-Beck disease. Selenium also has anti-inflammatory effects and anti-aflatoxins, nitrosamines and other carcinogens in the human body. Selenium can also reduce the side effects of radiotherapy and chemotherapy. Therefore, to supplement the human body with sufficient selenium is beneficial to human health. Food with selenium and more selenium-rich agri-

cultural products can effectively achieve the purpose of selenium supplementation for the human body.

(1) Customized production technology of selenium-enriched berry tea

The use of fertilizers that meet the national green food production standards. The customized production of selenium-enriched berry tea is based on the application of bio-organic selenium fertilizer during the crop growth process, and the foliar spray of organic selenium nutrient conditioner, so that the berry tea can grow in the normal process. Absorb and enrich the active selenium element, so that the product can reach the standard of organic selenium-enriched agricultural products.

Nutritional organic selenium conditioner products contain special nutritional functions and have high adsorption properties, which can quickly and efficiently supplement the absorption of selenium by crops and increase the selenium content in agricultural products. The product is a concentrated organic nutrient that can enhance crop resistance to disease and stress, reduce the toxicity of heavy metals to crops, increase crop yield, improve crop quality, and improve product quality and commodity value.

During the annual growth cycle of berry tea, selenium supplementation is carried out according to the following periods, and organic selenium nutrient conditioning agents are sprayed:

- a) Spray the new tea garden with seedling fertilizer before the first harvest in July;
- b) Spray once the adult tea garden for the first time in late March before budding after the beginning of spring;
- c) Spray once the adult tea garden for the second time from late May to early June;
- d) Spray once the adult tea garden for the third time from mid-August to early September;
- e) Spray once the adult tea garden from late October to mid-November in late autumn, when applying overwintering base fertilizer.

Through the above planting techniques of supplementing organic selenium, the selenium content of berry tea can meet the technical standards of relevant national selenium-enriched products, and the amino acid content, flavonoid content, and dihydromyricetin content are correspondingly increased, which not only increases the yield and quality, and increase the value of goods.

(2) Customized production technology of selenium-enriched meat and eggs

Adopting the national green food production standards for feed and feeding management, using nutritious organic selenium feed additives to supplement organic selenium in livestock and poultry feed and drinking water, facilitating the intake and absorption of livestock and poultry, and

forming selenium-enriched livestock and poultry in the enrichment group product.

5.3 Ecological environment improvement technology

A good ecological environment is the biggest advantage and precious wealth of the village. Relying on the ecological advantage to develop cultural tourism & health care ecological agriculture can cultivate the rural tourism service industry into a new highlight of agricultural development, and the ecological construction of a good living environment will become very important. In this regard, there are two important issues that must be considered and resolved.

Kitchen wastes, human feces and urine, crop stalks, tail vegetables, rotten fruits are all perishable and spoiled waste. These wastes can be regenerated resources. After the resources are regenerated, they can turn into precious. Agricultural means of production. Since this kind of resource is distributed in a wide area and has many characteristics, it is not suitable for large-scale centralized processing. A more reasonable and feasible way is to process on-site and digest on-site, and use small-scale centralized processing as the principle. Generally, the village or the production base is the processing unit.

(1) Collection and disposal of kitchen wastes

The kitchen wastes must be equipped with corresponding classified collection equipment and facilities, and should be collected. Take unified recovery, centralized processing, and on-site digestion as the main processing method. Centralized treatment needs to build a nearby treatment station based on the scale of the recycling volume, and focus on on-site treatment. Small retail households that are extremely scattered and deep in the plantation park can handle it by themselves, but need to strengthen supervision and implementation.

(2) Collection and treatment of toilets and human feces and urine

Where there are people, there are problems with toilets and human feces. From an ecological point of view, the living environment of leisure agriculture must meet the standards of ecological green and low-carbon environmental protection, and it is best to achieve zero emissions. This is completely achievable in the agricultural production environment, which is no better than the urban environment. The human settlement project in the agricultural ecological environment focuses on how to realize the separation of human feces and urine and the complete recyclability and utilization. The toilet system without water and sewage and the recyclable toilet with separation of urine and feces can fully achieve the above goals. The corresponding toilet system and toilet are shown in the figure below:

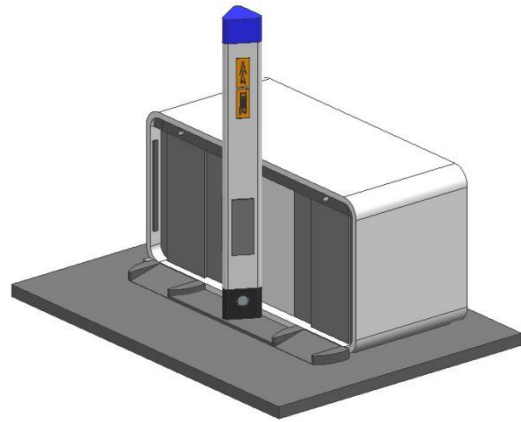


Figure 4. Eco-toilet system and toilet stools

5.4 Resource recycling technology

Resource recovery and regeneration are the key to the smooth realization of ecological recycling agriculture. A complete resource regeneration system is the fundamental guarantee to ensure that the ecological recycling agricultural system achieves low-cost and high-efficiency, and ensures the ecological environment and the health and safety of agricultural products.

The perfect resource regeneration technology includes three aspects.

(1) Microbial fermented feed technology for livestock and poultry

During the production of berry tea, a large number of stalks, leaves and residues are produced. Under the condition of no decay and deterioration, the feed fermentation microorganisms are sprayed after preliminary crushing, and then transported to a sealed container for 30-60 days of anaerobic fermentation. After maturation, take it out to dry, and crush the dried raw materials into powders. The powders become a very high-quality raw material for livestock and poultry feed. Take appropriate amount of powders and mix with appropriate ratio of energy raw mate-

rials. Protein ingredients, mineral elements, conditioners, oils can be made into high-quality livestock and poultry feed.

This kind of feed is added with probiotics for semi-fermentation before feeding, and then fed to livestock and poultry, which can significantly inhibit the production of manure and odor in farms, and can significantly improve the digestion and absorption rate of feed by livestock and poultry, and the ratio of feed to meat and the egg production rate have been significantly improved, and the immunity and disease resistance of livestock and poultry animals have also been greatly improved, which can completely eliminate the use of veterinary drugs and antibiotics. The flavor and taste of meat and egg products have been significantly improved, and can basically return to their original taste.

(2) Cultivation technology of selenium-rich and flavonoid-rich biological bacteria

In the berry tea garden planted with selenium-rich planting technology, the old yellow leaves and pruned straws after the autumn frost are also rich in selenium and high flavonoids after the one-year tea picking is completed, which is a very good resource raw material.

The old leaves and stalks after the production of the berry tea garden can be collected, dried in the sun, and removed of the mold and rot, and after two-stage pulverization, the berry tea stalks are crushed into 100-200 mesh berry tea stalk powders and stored in bags.

Take 7 parts of berry tea straw powder, 2 parts of rice oil bran, 1 part of other auxiliary materials, stir and mix evenly, add appropriate amount of water, adjust its moisture content to 45-60%, and it can be used for a variety of microorganisms with healthy functional properties. By adjusting different auxiliary material formulations, a variety of different microbial bacteria can be cultivated, and a variety of functional microbial bacteria products with higher health value and even medical value can be obtained.

(3) Biotransformation resource regeneration technology

For agricultural production, the most common way to turn perishable waste into resources is to use the composting method for treatment, and finally make a base fertilizer rich in organic matter and apply it to the soil. In recent years, a regenerative treatment method with higher resource value has gradually emerged-insect biotransformation method, that is, after the perishable garbage is eaten by the black soldier fly and other scavenging insects, the perishable garbage is finally converted into insect protein. As with insect manure, insect protein is an extremely good feed protein resource. Insect manure is a bio-organic fertilizer resource that can be directly applied. In this way, after insect biotransformation, the resource grade and val-

ue of perishable waste have been greatly improved.

The rotten and deteriorated stalks, fruits and vegetables, kitchen wastes, human and livestock manure are mixed for crushing and beating. After the beating, the microbial fermentation bacteria are sprayed. After 4 days of microbial fermentation, it is used to feed the black soldier flies. After the biotransformation of horsefly, these perishable wastes are completely transformed into black soldier fly protein resources and insect manure organic fertilizer resources.

Sewage from perishable garbage and sewage from human and animal excrement are collected, aggregated and mixed, and then subjected to microbial fermentation. After 15-20 days of fermentation, it becomes a high-concentration liquid organic fertilizer. Finally, add microbial conditioning strains and apply after filtering. The original solution must be diluted 100-200 times when used. The original solution is piped to the fertilizer and water integrated irrigation system in the plantation, and it is used for irrigation in a "small amount but more times" method. At the same time, it can be used in conjunction with microbial flushing and fertilizer to improve fertilizer efficiency, promote growth and increase production, improve taste and enhance flavor.

For domestic sewage, after 15-20 days of natural fermentation with specially formulated microorganisms, the active heavy metal ions in the sewage and its sludge are completely passivated. At this time, it can be used as agricultural irrigation water and filtered into the fertilizer-water integrated irrigation system to carry out irrigation and consumption.

All wastes generated in the production and living processes are processed in a negative pressure system or a closed container during the recycling process, and the gas pollution sources produced by it are piped into the special deodorizing equipment, and oxidative degradation purification is carried out in the process. After purification reaches the standard, it is discharged into the atmosphere.

A perfect resource regeneration system is not only a value generation system for resource regeneration and transformation, but also an ecological protection system that can completely eliminate the "three wastes" pollution caused by agricultural production and human life. It is a purifier of the "three wastes" and a protector of the ecological environment.

5.5 Principles of traditional Chinese medicine technology and methods applying to agriculture (Chinese medicine agriculture)

Faced with the threats to humans caused by the rejuvenation of various diseases, and "the cure is not as good as the prevention", and strive to seek a life rhythm that

is more in harmony with nature, and create a living condition that is conducive to ecology, life health, healthy food and health air. Pastoral & health & health care model has gradually attracted the attention of all mankind. After many years, 80% of the population will need this kind of life as a life protection agent, and the industry development of the pastoral & health & health care model will develop rapidly.

Principles of traditional Chinese medicine technology and methods applying to agriculture (Chinese medicine agriculture) is the carrier of traditional Chinese farming culture. It is the crystallization of the hard work and wisdom of the Chinese nation for thousands of years. It is the integration, inheritance and innovative development of farming culture and traditional Chinese medicine culture. It is an ecological agriculture with Chinese characteristics.

Principles of traditional Chinese medicine technology and methods applying to agriculture (Chinese medicine agriculture) can comprehensively prevent and control the three-dimensional pollution of water, soil and air in the production area of agricultural products and improve the environment of the production area, promote the healthy growth of animals and plants, and ensure the effective supply and quality safety of agricultural products.

In production practice, the principles and technical methods of Chinese medicine are mainly used in three aspects of agriculture:

(1) Use Chinese herbal medicine to produce “two medicines” (pesticides and veterinary drugs) to protect the growth of animals and plants;

(2) Use the combination of Chinese herbal medicine and natural nutrients to produce “two materials” (fertilizer and feed) to promote the growth of animals and plants;

(3) Use the mechanism of mutual growth and restraint between functional animals and plants (such as living Chinese herbal medicines) and other biological communities to regulate the growth of animals and plants.

The agricultural products produced by traditional Chinese medicine agricultural technology are generally characterized by high-quality, high-yield, ecological safety, good color and fragrance, strong functionality, long-term freshness, and good stress resistance, and their production costs have been reduced. Traditional Chinese medicine agriculture can produce “food and medicine homology” or functional agricultural products for sub-healthy people (about 70% of the total population) to improve immunity. Traditional Chinese medicine agriculture has important application value in the development and application of food and medicine homologous food, health food and food for special medical purposes.

5.6 Modern production management technology

The planting process uses mechanical soil loosening and fertilization, mechanical pruning and collecting and breaking, using drones for spraying and topdressing and pest prevention and control, using fertilizer and water integrated automatic irrigation system for fertilizer and daily irrigation management. Through soil temperature and humidity sensors, Internet of Things cameras and 5G Internet of Things technology, it realizes remote monitoring of soil moisture and dynamic tracking of the growth environment of berry tea, grasps various growth data in time, and controls product quality throughout the process. The planting area is equipped with frequency-vibrating solar insecticidal lamps, set up pest information interference points, and hang micro-information intervention bags to improve the photosynthetic respiration of crops, promote crop growth, and promote the strong growth of stress resistance factors in crops, so as to achieve disease resistance.

Planting the insect repellent plants and the flower plants growing with berry tea in the gaps to improve the quality of the ecological environment and further reduce the number of pests.

Berry tea garden uses microbial herbicides for weed control, which can not only achieve the purpose of removing weeds, but also avoid the ecological pollution and health hazards caused by the use of chemical herbicides.

The construction of the breeding farm considers the need for the treatment of manure resources. Raising pigs and chickens adopt a construction pattern of different houses on the same farm. At the same time, the planning and construction of a biological conversion farm for manure resources regeneration is also considered. According to the method of “three feces in one” (human feces and urine collected from the toilet in the park or nearby living area are mixed with pig feces and chicken feces, the mixed comprehensive nutrient ratio is balanced, which is very suitable for insect biotransformation treatment), after being fermented and processed into protein feed, the bio-transformed feed is fed to the black soldier flies to realize the resource conversion. The converted black soldier fly protein is used as feed protein to supplement the livestock and poultry feed. The black soldier fly protein itself also has very unique biological characteristics. The beneficial supplement of the black soldier fly protein in the feed can effectively improve the quality of livestock and poultry products. As well as health care functions, the black soldier fly dung is used as an excellent organic fertilizer and then applied to the berry tea plantation, which can greatly improve the soil structure, enhance the soil

fertility, and increase the product quality and yield of berry tea.

A high-pressure spray system is arranged in the breeding farm and in the house. The automatic control system realizes the supplementation of the beneficial microbial flora of the breeding farm and the suppression of non-point source odor. The air is cleaned and purified regularly, and it is also heatstroke prevention and cooling. The role of moisturizing.

Fermented feed feeding technology is adopted for livestock and poultry breeding, which can effectively improve the quality of livestock and poultry products and reduce the emission of manure and odor, without bringing a burden to the ecological environment of the breeding area.

The livestock and poultry drinking water adopts a special water quality improvement process system, and the micro-information intervention technology is used to improve the drinking water quality, so that the livestock and poultry can drink small molecular clusters of active hydrogen-rich water for a long time, so as to improve the body's health and make its metabolism vigorous, which can prevent a variety of diseases.

After the laying period of the laying hens is over, the chickens have been over one year old, and the laying hens that have been put off the shelves are rewilded under the forest and stocked in the berry tea garden. After about 45 days of free-range conditioning, restoration and transformation, they can recover wildness of more than 90%. The meat quality and taste of the chicken are as good as or even higher than the quality of ordinary domestic chickens. Moreover, it has higher nutritional value and is a superior nourishing product.

6. Practical Significance of Combination of Planting and Feeding Ecological Recycling Agriculture to Existing Industries

6.1 Ecological significance

After the ecological recycling agriculture system is completed and put into operation, the fields in the plantation park are clean, the soil and water have been purified and repaired unprecedentedly, the plants grow healthier and stronger, and the ambient air quality is better. The farms are clean and tidy, the environment is airy and breathable, the trees are shaded, and the flowers are clustered. The cross-flow sewage, blockage of rivers, stalks everywhere, smelly air, dung and dirt on the ground, mosquitoes and flies flying indiscriminately will never be seen again. The overall ecological environment has been unprecedentedly improved, effectively protecting the green waters and green mountains.

6.2 Economic significance

A good ecological environment, a scientific planting and breeding technology system, and a healthy process philosophy ensure the health and safety of the entire agricultural production process. The recycling of agricultural and domestic waste resources, and the safety of input materials for planting and breeding, avoid the use of pesticides, fertilizer hormones and antibiotics. In addition, it adopts the traditional agricultural production method of "more emphasis on prevention than treatment" and "emphasis on more environmental governance than disease management", to ensure a healthy environment to produce healthy products. The ecological recycling agriculture system is a technical system focusing on a healthy environment. It uses a series of technical means to ensure the health of the environment, to promote the healthy growth of individual animals and plants with a healthy environment, and obtains healthy and high-quality products with healthy and high-quality individual growth, and even functional customized products with special effects.

The enormous abundance of products produced, the upgrading of product quality, and the improvement and expansion of the agricultural industry structure will in turn promote the rapid development of the local economy.

6.3 Deep development significance

Constructing a berry tea ecological recycling agriculture system and supplementing related breeding links on the basis of berry tea planting are a great supplement to the local agricultural output, and are also a full and reasonable use of berry tea plant resources. Conversely, the addition of breeding industry is also a beneficial supplement to the berry tea planting industry. In terms of resource utilization and agricultural production, they are complementary and beneficial and promote each other.

Since breeding is based on the full utilization of the plant resources of berry tea, the unique value of berry tea will also have very unique value and significance after assimilation and enrichment.

From the perspective of resource transformation and utilization, because the breeding scale and the planting scale need to match, the overall local agricultural industry scale and industrial benefits have been multiplied with the establishment of the ecological recycling agricultural system.

The abundant natural tourism resources bring a large number of tourists, and the beautiful and healthy agricultural ecological environment and the supply of high-quality, healthy and abundant agricultural products will inevitably attract a considerable number of tourists to linger on.

After the completion of the advanced modern ecological recycling agricultural system, it provides the possibility for agricultural ecological tourism, creative cultural tourism and health recuperation. After the relevant elements of leisure agriculture are grafted in, the connotation and extension of the agricultural industry will be further greatly expanded, and it will also bring further space for local industrial revitalization and economic development.

7. Conclusion

This paper analyzes the characteristics of the berry tea industry, summarizes the unique functional value of berry tea crops, and combines the beneficial analysis of various local resources, and proposes an agricultural production model that is more conducive to the development of the berry tea industry, and a system of building a planting and breeding ecological recycling agricultural technology around the cultivation of berry tea. Through the detailed analysis of the agricultural technology system, it systematically explained the upgrading of the berry tea industry, expanding the industrial structure, enriching the types of output products, and deepening the development of the industry, and finally reached the conclusion that the development of the combination of planting and breeding around the production of berry tea Ecological recycling

agriculture can further ensure the health and safety of the ecological environment and various agricultural products produced, can effectively realize the organic combination of cultural tourism, health and agriculture, and can exponentially expand the scale of local agriculture and economic benefits. It is a very effective new agricultural production model for rural revitalization and economic development.

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