Discussion on the Application of Plant-derived Pesticides in the Production of Pollution-free Agricultural Products

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Abstract: The study found that excessive use of chemical pesticide products will have a negative impact on people's health. As people's living standards improve, the demand for food is also increasing. Plant-derived pesticides have the advantages of low toxicity and low residue. Therefore, plant-derived pesticides should be selected in the production of pollution-free agricultural products. This paper analyzes the concept and advantages of plant-derived pesticides, studies the application of plant-derived pesticides in the production of pollution-free agricultural products, and explores measures to promote the promotion of plant-derived pesticides.

1. Introduction

With the improvement of people's living standards and the emphasis on food safety, the types of pollution-free agricultural products are gradually increasing. However, with the continuous development of agriculture, the types of pests and diseases have gradually increased, and the difficulty of prevention and control has also increased. In the agricultural production process, due to the large-scale use of chemical pesticides by farmers, the pesticide residues in agricultural products are too high, which has a negative impact on people's health. Therefore, in order to avoid this problem, it is necessary to actively promote the application of plant-derived pesticides in the production of pollution-free agricultural products.

2. The concept and advantages of plant-derived pesticides

2.1. The concept of plant-derived pesticides

According to the source, pesticides can be classified into mineral source pesticides, chemical synthetic pesticides and biological source pesticides. Bio-sourced pesticides can be divided into plant-derived, animal-derived, and microbe-derived. Plant-derived pesticides refer to pesticides made from plants. Because they are made from plants, they have the advantages of low toxicity, low residue, and high efficiency. For more than 1,000 years BC, humans began to use plant-derived pesticides. In addition, some plant-derived pesticides can be used to adjust plant growth, so that plant-derived pesticides can be actively applied in the production of pollution-free agricultural products.

2.2. The advantages of plant-derived pesticides

The plant-derived pesticide is a substance present in nature, which can be rapidly degraded after being applied to the production of pollution-free agricultural products, and does not pollute the surrounding environment, so it belongs to green pesticides. When the conventional chemical pesticides are used to control pests, the pesticides will act on a certain physiological system or multiple targets of the pests; the active ingredients of the plant-derived insecticides are complex, which can affect the multiple systems of the pests. Using the plant-derived insecticides can reduce the resistance of pests; some plant-derived pesticides can promote the rapid growth of plants, which is of great significance for improving the quality of agricultural products and improving farmers' economic benefits.

3. Application of plant-derived pesticides in the production of pollution-free agricultural products

3.1. Insecticidal alkaloids

In the production of pollution-free agricultural products, insecticidal alkaloids have achieved good results. Hundreds of bases, nicotine, etc. are all insecticidal alkaloids. The most important part of the insecticidal alkaloid is its alkali molecular structure. As long as the proper amount of insecticidal alkaloids is sprayed in the production process of the agricultural products, the nervous system will be disordered after the pests encounter the insecticidal alkaloids, thereby paralyzing and dying. Insecticidal alkaloids are less toxic and their toxicity can be quickly degradate in vertebrate animals. At this stage, the insecticidal alkaloids that can be used in the production of pollution-free agricultural products are matrine, oxymatrine and other types. Farmers need to adjust the amount of insecticidal alkaloids according to the types and extent of crop pests and diseases. For example, in order to prevent pests such as worms and mites that may occur during the production of pollution-free vegetables, nicotine can be used in combination with matrine; in order to prevent pests such as jaundice and aphids that may occur during the production of pollution-free agricultural products, Matrine can be used in combination with nicotine; in order to prevent and control aphids, worms and other pests in the production process of pollution-free vegetables, oxymatrine can be used; in order to prevent the occurrence of sticky insects and cotton worms in the production process of cruciferous vegetables, nicotine can be used.

3.2. Limonoids

The bitter wood plant contains a citrate compound, which also belongs to a plant-derived pesticide. Good results can be obtained by using citrate compounds in the production of pollution-free agricultural products (Azadirachtin in lemon compounds can effectively prevent pests and diseases). In addition, the lycopene contained in the citrate compound can be used to control the common worms and insects in the growth process of cruciferous vegetables; In order to prevent common aphids, two-spotted spider mite and other insect pests in the growth of pollution-free kidney beans, blood root base can be used; for the disease such as powdery mildew that often occurs in the growth of pollution-free cucumbers, allicin can be used for prevention; for the tea worms that often occur in the growth of pollution-free vegetables, osthole can be used for prevention.

3.3. Celangulin, rotenone

The celangulin and rotenone can effectively prevent various insect pests in the production of pollution-free agricultural products, and it does not remain in the agricultural products after use, and does not pollute the surrounding environment. It is precisely because of the structure of dihydrofuran polyester in celangulin and rotenone that it has a better effect of preventing pests and diseases, and it can be used for preventing most pests and causing paralysis of pests. Rotenone can effectively reduce the ATP content of pests, affect the energy supply of pests, and thus inhibit the breathing of pests, resulting in the death of pests. For the plutella xylostella often found in the production of pollution-free agricultural products, it is necessary to use azadirachtin for prevention.

4. Problems to be paid attention to in the application of plant-derived pesticides

4.1. Reasonable selection of pesticide varieties

Studies have found that many plant-derived pesticides have strong biological activity and can prevent a variety of pests and diseases, but all plant-derived pesticides have the most effective control objects. For example, for the two pests, red spider and cabbage caterpillar, rotenone can be used. Prevention with pyrethrin. However, when the conditions are the same, rotenone is better for the control of red spider, and pyrethrin is better for the control of cabbage caterpillar. It can be seen that if red spider pests occur during the growth of pollution-free crops, it is necessary to use rotenone control reasonably; if there is a cabbage worm in the growth process of pollution-free crops, it is necessary to use pyrethroids reasonably. Under normal circumstances, farmers need to choose the plant-derived pesticides produced by regular manufacturers. In the procurement process, detailed instructions on pesticide use should be made, and the main control objects should be checked to ensure that the selected plant-derived pesticides can effectively prevent pests and diseases. If a variety of pests and diseases occur during the growth of pollution-free agricultural products, it is necessary to select a variety of plant-derived pesticides or to combine plant-derived pesticides with other bio-sourced pesticides to enhance their control effects.

4.2. Use pesticides in advance

Compared with chemical pesticides, the efficacy of plant-derived pesticides is not good enough, and the prevention of pests and diseases is not fast enough. However, plant-derived pesticides have the advantage that chemical pesticides do not have: plant-derived pesticides not only have the function of preventing pests and diseases, but also can properly regulate the ability of plants to resist pests and diseases. Therefore, when using plant-derived pesticides, farmers should choose the best time to use according to the characteristics of plant-derived pesticides, so as to effectively improve the prevention of pests and diseases. In order to improve the prevention effect of pests and diseases and reduce the loss of agricultural products, farmers must adhere to the principle of “governing early and treating small ones”. In short, when pests appear in pollution-free agricultural products, it is necessary to select the most suitable plant-derived pesticides to kill insects. When using plant-derived fungicides to prevent diseases, it is necessary to adhere to the principle of “prevention first”, spraying targeted plant-derived pesticides in the early stage of pollution-free agricultural products without disease or disease beginning. This will not only prevent pests and diseases, but also enhance the ability of plants to resist pests and diseases.

4.3. Morning and evening use, constant spray

The factors affecting the prevention effect of plant-derived pesticide pests and diseases are: plant-derived pesticide types, medication time, and environmental factors. Because some of the plant-derived pesticides have low active ingredients, they will rapidly degrade when exposed to sunlight and exposed to the air. Therefore, in order to ensure that the plant-derived pesticides can fully exert their effects, the drugs can be sprayed in the evening or cloudy weather. In addition, most of the plant-derived pesticides cannot be absorbed internally. They can only be killed after the pests, germs and drugs are in contact. Therefore, the plant-derived pesticides can be sprayed by a constant spray method, and the spray uniformity needs to be ensured.

4.4. Secondary dilution

When arranging drugs, farmers need to use a small amount of water to mix the plant-derived pesticides thoroughly, then pour them into the vats, and then add appropriate amount of water to mix them evenly. Farmers can also add about one-third of the water to the vat in advance, then pour the botanical pesticide into the vat and stir it. After mixing for 5 minutes, pour the rest of the water into the vat and stir. The drug can be sprayed evenly after it is evenly diluted. The medicines configured in this way can ensure that the plant-derived pesticides are fully mixed with water, and can effectively improve the control effect of pests and diseases. In addition, the water temperature will also affect the control effect of liquid medicine pests and diseases. In cold winter or northern areas, it is necessary to ensure that the water temperature of the liquid is above 20 degrees Celsius, so as to ensure the efficacy. For plants that are difficult to wet with some sprays, some detergent powder should be added when configuring the liquid, which can effectively improve the efficacy.

5. Problems in plant-derived pesticides and problems in their promotion

5.1. Characteristics of plant-derived pesticides themselves

The study found that most of the plant-derived pesticides are not as stable as chemical pesticides, and their effects are relatively slow, and they cannot quickly eliminate sudden and serious pests and diseases. Some plant-derived pesticides have a faster rate of reduction in activity and a shorter shelf life. Therefore, additives must be added during the production process to reduce the adverse effects of environmental factors (such as temperature, humidity, etc.) on plant-derived pesticides. Some plant-derived pesticides will decompose rapidly under sunlight, so to ensure the efficacy, try to spray the drug in the evening or cloudy weather. In addition, when the ambient temperature is high and the humidity is high, the active ingredient in the plant-derived pesticide can be quickly volatilized, thereby improving its efficacy.

5.2. Low degree of commercialization

The survey found that the plant-derived pesticides used in the production of pollution-free agricultural products are relatively small and the supply is also small. Therefore, the price of plant-derived pesticides is relatively high. At this stage, there are more than 80 kinds of plant-derived pesticides that can be produced in China, among which more than 20 kinds of plant-derived pesticides can achieve the purpose of regulating the growth rate of plants; more than 60 kinds of plant-derived pesticides can achieve the regulation role of killing pests and killing germs. There are more than 100 manufacturers that can produce plant-derived pesticides in China, and the actual normal operation of the manufacturers is not enough. Some plant-derived pesticides are registered,

but they are discontinued after registration, so they are not available to users. In addition, the price of plant-derived pesticide products is relatively high. Based on the price per acre of pesticide application, it can be found that the cost of using plant-derived pesticides is much higher than that of chemical pesticides, which is also an important factor affecting the promotion effect of plant-derived pesticides. China's plant-derived pesticide manufacturers are not large enough, and their production technology and production equipment are relatively backward. Therefore, the plant-derived pesticides produced by them cannot meet the production requirements of pollution-free agricultural products. In short, most of the sales in China's pesticide market are chemical drugs, and varieties and prices are important factors affecting the promotion of plant-derived pesticides.

5.3. Other factors

In addition to the above points, the awareness of environmental protection of farmers in China is not high enough, the awareness of sustainable development of agriculture has not been correctly established, the production base of large-scale pollution-free agricultural products has not been established, and the system has not been established and improved, which is an important factor affecting the promotion of plant-derived pesticides. With the rapid development of technology and economy, people are more inclined to buy green food, so many farmers began to plant pollution-free agricultural products. Since plant-derived pesticides have low toxicity and rapid degradation rate, their application to the production of pollution-free agricultural products can improve product quality. Affected by the interests, some manufacturers sell non-biological pesticide products as plant-derived pesticides and green pesticides, which makes the pesticide market more chaotic. With the mixed configuration of chemical pesticides and biological pesticides, many people do not understand the role and principle of pesticides, which is also an important factor affecting the development of pesticides in plant sources.

In recent years, the prices of agricultural production necessities such as seeds, pesticides, and expenditures have also gradually increased. Some farmers believe that the use of plant-derived pesticides will increase their production costs. Therefore, the promotion of plant-derived pesticides in rural areas is difficult. Some farmers who purchase plant-derived pesticides, because no one has guided them how to use pesticides correctly, so that pesticides cannot fully play their due role, which will also affect farmers' enthusiasm for purchasing plant-derived pesticides.

6. Measures to promote the promotion of plant-derived pesticides

6.1. Scientific determination of plant source pesticide positioning

In order to promote plant-derived pesticides, it is necessary to scientifically determine its location and reasonably determine its price.

(1) Production base for pollution-free agricultural products. The price of pollution-free agricultural products is relatively high, but it requires high levels of pesticides. To ensure the quality of agricultural products, it is necessary to select plant-derived pesticides. When planting vegetables, fruit trees, tea and other plants, it is strictly forbidden to use highly toxic pesticides.

(2) Adopting three-dimensional planting mode. Most of the southern countries adopt the three-dimensional planting mode. Therefore, the requirements for pesticides are relatively high. The pesticides used must not only have the function of controlling rice pests and diseases, but also have no adverse effects on aquatic products. Botanical pesticides have the advantage of being low in toxicity and can therefore be used in this area.

(3) Export agriculture. With the development of science and technology and economy, countries' requirements for the quality and environmental protection of imported agricultural products have

gradually increased. Therefore, in order to improve the quality of China's agricultural products, it is necessary to use plant-derived pesticides, which are low-toxic and fast-degrading pesticides.

6.2. Standardization

China needs to analyze the quality inspection methods of plant-derived pesticides in detail, establish and improve national standards and industry standards, and strictly check the quality of pesticide production, which plays an important role in promoting the development of bio-pesticide industry. The pesticide examination and registration management department shall urge the enterprise to truthfully declare the cost of the pesticide product, and review the authenticity of the application materials in detail, and test the samples submitted by the enterprise to ensure that the products developed by the enterprise are plant-derived pesticides. In addition, it is necessary to standardize the pesticide market and severely crack down on manufacturers and distributors who produce and sell prohibited pesticides.

6.3. Strengthen publicity and promotion

Pesticide manufacturers need to strengthen the research and development of plant-derived pesticides, increase the types of plant-derived pesticides, expand the scale of production, and strengthen the publicity and promotion of plant-derived pesticides. Pesticide manufacturers need to actively introduce advanced production technologies to reduce agricultural production costs. In order to ensure the smooth development of plant-derived pesticide production activities, plants of plant-derived pesticide resources need to be planted. Mixing such plants with other plants can not only improve environmental quality, prevent pests and diseases, but also provide raw materials for plant-derived pesticide production.

7. Conclusion

All in all, although plant-derived pesticides have many advantages and have broad development space, in a short period of time, plant-derived pesticides cannot replace the status of chemical pesticides in agricultural production. However, in order to promote plant-derived pesticides, it is necessary to upgrade agricultural production technology, improve farmers' scientific and technological quality and environmental awareness. In addition, it is necessary to increase the research and development of plant-derived pesticides. Only in this way can plant-derived pesticides be promoted nationwide.

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