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Preface

Based on all the field investigation we determined to write a handbook about the knowledge of normal pesticides,the health risks,the right protective measures as well introduce our bio-pesticides to users.The

Because of the just started technology and the high cost of biological pesticide, it will take a long time to popularize the bio-pesticides.At present,chemical pesticides still occupy the leading position.Here,We remind that the chemical pesticides users should pay attention to the following points when using pesticides:

1. Distinguish High, medium and low toxicity pesticides and try to avoid human and livestock poisoning.
2. Ensure the medical equipment operate normally Check the spraying equipment before spraying if leakage or nozzle blocked carefully.
3. Collect and unified burial the waste pesticide packages which are used up or scattered in the environment.
4. Don't store pesticides together with food and vegetables. Please put it far from humans and animals.Put it in the places where children are difficult to get.
5. Don't mix pesticides with well or river water.There is lots of impurities contained in flowing water and it easy to cause blockage.



Table of Contents

- 01 What is pesticide?
- 02 How is the pesticide going ?
- 03 Why can you choice IGEM Lzu bio-pesticide?
- 04 How to use Lzu bio-pesticide?
- 05 The reassuring IGEM Lzu bio-pesticide.

What is pesticide?

1.Definition
Pesticides is a chemical used to prevent harmful organisms (pests,mites,nematodes,pathogens,weeds and rodents) which could destroy agriculture,forestry and husbandry and to regulate the growth of plants.

2.Classification

- (1)According to the sources of materials , they are divided into organic pesticides, inorganic pesticides, plant pesticides, microbial pesticides and insect hormones.
- (2) According to the processing dosage form, they are divided into powder, wettable powder, soluble powder, emulsion, emulsifiable concentrate, concentrated emulsion, cream, paste, colloid, aerosol, oil and particle agent etc..
- (3) According to the object of prevention and control , they are divided into pesticides, fungicides, fungicides, fungicides, fungicides, herbicides, leaf removal agents, plant growth



How is the pesticide going ?

1. The status of herbicide

At present, the main herbicides (selective killing crops):2,4-D, and trifluralin.

- (1) Selective herbicides (selective killing crops):2,4-D, and trifluralin.
- (2) Destructive herbicide (are toxic to all plants):Sodium pentachlorophenol , Sodium chlorate , gramoxone , glyphosate.
- (3) Contact-killing herbicides (can only kill the parts of plants which contact with herbicides):2,4-dichloro-1-(4-nitrophenoxy)benzene
- (4) Conductive herbicide (can be absorbed by the roots, leaves and other parts of plants and transported the whole plants through the conduction tissue), Chipton and so on.

2.The harm of herbicide

- (1)Residue
The paper shows that the residual herbicide is harmful to the second sensitive crops, by the soil PH,temperature etc ,even after 2-3 years. The destructive herbicide ,for example,Sodium pentachlorophenol, will make potential phytotoxicity in a large area of using and result in the production of crops decrease. The content of glyphosate in the commonest 14 kinds of beer in Germany is 0.46-29.74 μg/L-1. But the standards of Germany drinking water required that the highest of the content of glyphosate is 0.1 μg/L-1.
- (2)Pathopoeisis
Because of bioaccumulation and attaching to the herbicides , herbicide accumulate in human body. Then it causes mucosal congestion, gene mutation and various of inflammatory reactions. With the toxic absorbed into the blood circulation, it results in the mononuclear phagocyte, lymphocyte, and liver losing the function of defense and synthesis and causes the pathological process of tissue diffusing,humoral diffusion even nerve diffusion. International Agency for Research on Cancer(IARC) lists more than 10 kinds of pesticide such as glyphosate and sodium chlorate in "probably carcinogenic". And epidemiological studies have found that glyphosate has mutagenicity, genotoxicity, developmental toxicity, cytotoxicity and reproductive toxicity.
- (3)Drifting phytotoxicity
Gramoxone, 2,4-D etc are highly toxic pesticides. They are easy to volatilize. There are some data show that spraying partial can drift for nearly 800 meters , which can cause broad crops damaged and make leaves narrower and smaller.
- (4)Producing resistant weeds
The paper shows that the weeds communities change and the resistance to pesticide increases in recent years , because of the change of farming system, the abusement of herbicides, the mixture of herbicides and genetically modified crops.

The selectivity principle of herbicide are

- (1) The selection of position differentiation and time differentiation (ecological selection):
A. Position differentiation: It uses the different positions of soil or space between crop and weeds and gets selectivity.
B. Time differentiation: It forms selectivity resulting from differences between weed germination and seedling .
- (2) Morphological selectivity: the selectivity is obtained by the different morphological from crops and weeds.
- (3)Physiological selectivity: the selectivity is obtained by plant stems, leaves and roots

The theory of chemical herbicides' use should choice mixed-principle. Make different herbicide mixed , which have different herbicide controlling spectra, using same method and no precipitation after mixing. It can make use of advantages rightly and improve all the efficacy of herbicides. But in the actual investigation,we found that most farmers use single herbicide in the long-term. It leads a large number of residual glyphosate and in the future , many malignant weeds will be hard-killing.
Glyphosate is one of the most used- widely herbicides in our country. Because of its high efficiency, low toxicity and wide herbicide controlling spectra , it is widely used in agriculture and forestry. Glyphosate mainly inhibit the Enol Acetyl Shikimene Phosphoric Synthetase of plants . And Shikimene can not transform into phenylalanine, tyrosine and tryptophan . Then the synthesis of protein will be disturbed and it will lead the plants to dead.Although glyphosate is a low-resistant herbicide , its abuse has led to excessive selecting pressure and the number of glyphosate-resistance weeds increase year by year.

Why can you choice IGEM Lzu bio-pesticide?

IGEM Lzu bio-pesticide is water-soluble and able to killing both weeds and instruct microbial pesticide.

Main functions	Main constituents	Main principle
The dsRNA(double stranded RNA) in IGEM Lzu bio-pesticide will lead interference effect when it is absorbed by the weeds . The dsRNA could make the key gene silenced , which is necessary for weeds and Aphidoidea growth. Thus the weeds and Aphidoidea couldn't grow normally ,crops will be protected.	can targeting silences the salivary sheath protein of Aphidoidea . (4)The dsRNA which can targeting silences the ecvsteroid receptor of Aphidoidea . (1)The dsRNA which can targeting silences the malic lyase of Setaria . (2)The dsRNA which can targeting silences the citrate (5)-synthase of Setaria . (3)The dsRNA which can targeting silences the salivary sheath protein of Aphidoidea . (4)The dsRNA which can targeting silences the ecvsteroid receptor of Aphidoidea .	IGEM Lzu bio-pesticide use RNAi technology (RNA interference,RNAi) mediate the mRNA which in specific cells degraded , by endogenous or exogenous dsRNA . Ultimately , it will lead post-transcriptional gene silencing) to kill weeds and Aphidoidea

