National Green Plant Protection and Pesticide Risk Reduction(PRR) in China: Strategies and Practice

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Content

1. Background,
2. Policies, standards, initiatives, Mission for PRR in China
3. Main practices for PRR in China
4. Key Achievements
5. Future Plans

1. Food Security and the importance of Pesticide

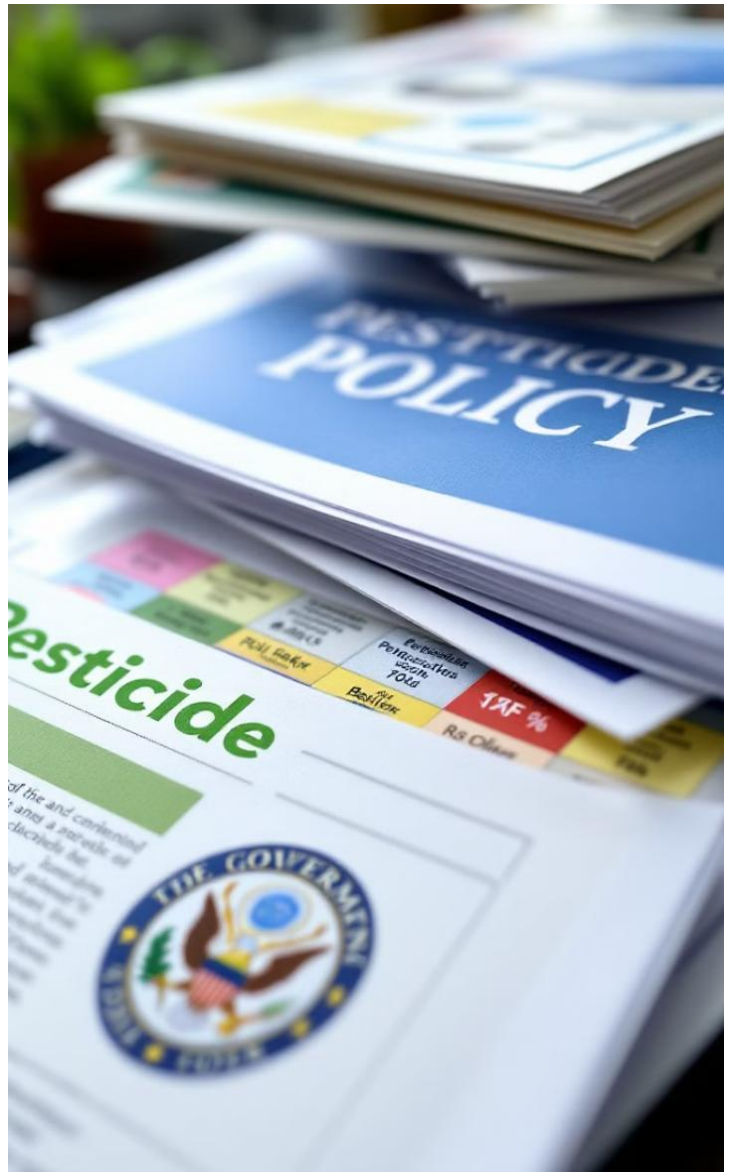
- Application of pesticides could save 30-40% loss of total crop production worldwide. (FAO)
- Pesticides remain indispensable for pest and disease control and are still the most effective method.
- Improper pesticide application leads to Pesticide risk issues.
- It is important and necessary to carry out the green plant protection and Pesticide risk control.

2.1. National Policies and Regulation by the Chinese Government

① **2001- Pesticide Management Regulations:** Clarified requirements for pesticide production, sales, use, and waste management.

② **2017- its Revision:** Strengthened control over high-risk pesticides, banning or restricting highly toxic and high-residue pesticides.

③ **Pesticide Registration Management Measures, Pesticide Label and Instruction Manual Management Measures:** Ensured safe use and effective management of pesticides.



2.2. Standards and Guidelines for Pesticide Use and Management

① **2006- Guidelines for the Rational Use of Pesticides:** Specified pesticide dosage, frequency, and safety intervals for different crops.

② **2022- GB2763 food safety for Pesticide residue:** Defined maximum residue limits for pesticides in various foods. Over 13,000 pesticide residue limits covering 560+ pesticides and 300+ agricultural products.

2.3. Initiatives and Action Plans for Pesticide Risk Reduction

2015 MST-Key R&D Program

Research on integrated technologies for reducing pesticide use and increasing efficiency.

2016-MOA-Zero Growth Plan by 2020

Promoted green control technologies and integrated pest management to reduce pesticide use.

2018-MOA Pesticide Reduction and Efficiency Enhancement Action Plan

Clarified goals and measures for pesticide reduction.

2.4. Contributions from Research Institutions and Enterprises

1

Research Institutions

Developed high-efficiency, low-risk pesticides and green control technologies.

2

Enterprises

Promoted bio-pesticides and optimized pesticide formulations.

3

Scientists

Participated in international standard-setting and promoted technological innovation.

3. Main Practices for pesticide risk reduction in China

① Development and Application of High-efficiency, Low-Risk Pesticides

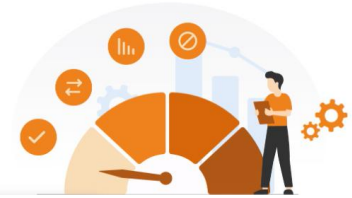
② National Unified Prevention and control

③ Subsidies for Bio-control and Bio-pesticide.

④ Develop low-risk application techniques and supporting equipment.

⑤ Scientific Management of Pesticide

⑥ Establish safety standards to control the impact of pesticide risks.



3.1 High effective and low risk pesticides: KT-B

KT-B Prevents Rice Sheath Blight

- **Dr. Yang Qing’ s innovative discovery of the KT-B inhibits the modification of chitin in the pathogen's cell wall. This process helps plants recognize the pathogen and activate immune defense responses, to achieve protection against fungal diseases.**

Sheath Blight: one of the most serious diseases of rice

Fungal pathogens: *Rhizoctonia solani* Kühn

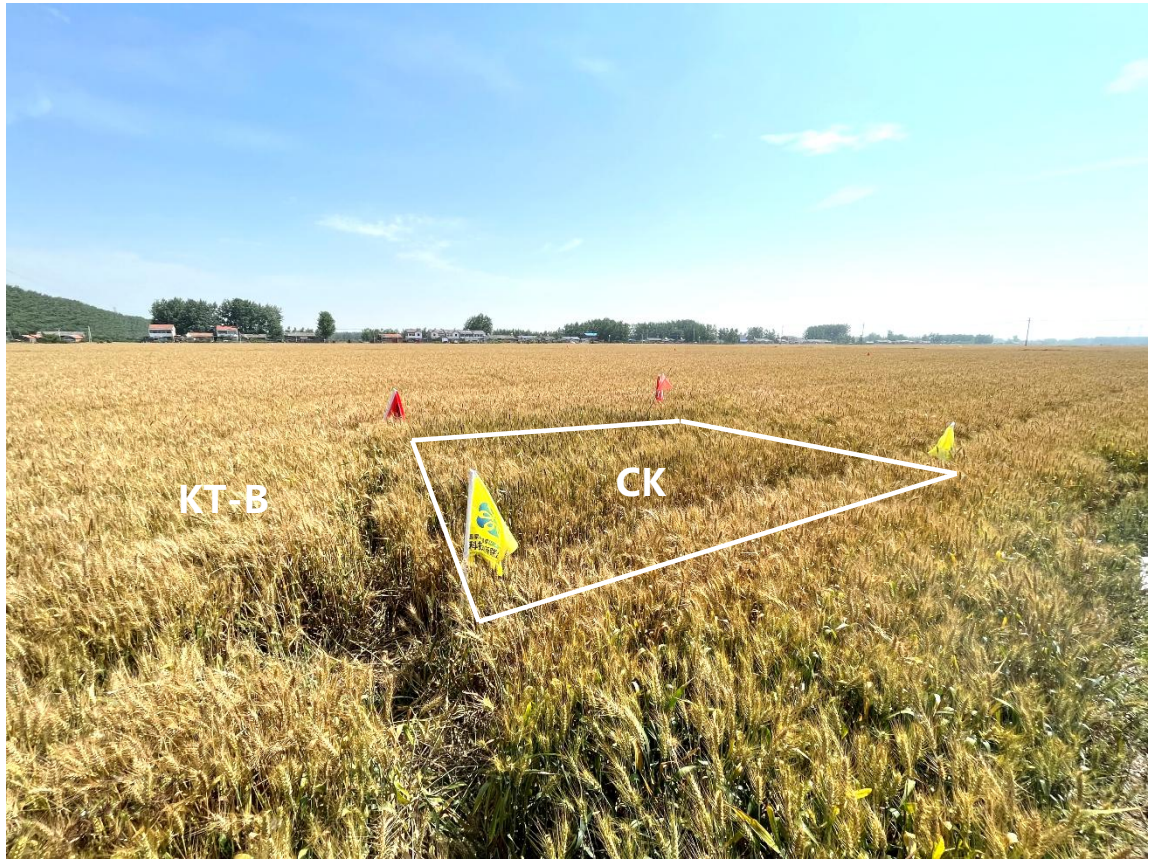
Symptoms: sheath blight, foliar blight, leaf blight, web-blight, head rot, bottom rot and brown patch.

Damage: the disease causes a yield reduction ranging from 20 to 50% depending on the severity of infection.

KT-B can reduce the disease index of rice sheath blight by 80%

3.1 High effective and low risk pesticides: KT-B

KT-B Prevents Fusarium Head Blight of wheat



Fusarium Head Blight: the second most severe wheat disease

Fungal pathogens: *Fusarium graminearum*

Symptoms: the most common symptom of FHB is premature bleaching or blighting of heads.

Damage: FHB affects kernel development, causes a global yield loss of 21.5% and reduces grade. It can also contaminate grain with a fungal toxin (mycotoxin) produced in infected seeds.

KT-B can reduce the DON toxin content by 81.7%

KT-B is high biosafety for no-target animals

- **non-toxic to humans and animals**

Aquatic organisms

Daphnia magna Straus
EC_{50} (48h) = 21.1 mg a.i./L
Low toxicity (> 10 mg a.i./L)

Danio rerio
LC_{50} (96h) = 45.0 mg a.i./L
Low toxicity (> 10 mg a.i./L)

Apis mellifera ligustica
LD_{50} (48h) = 86.5 μg a.i./bee
Low toxicity (>11 μg a.i./bee)

Coturnix japonica
LD_{50} (7d) = 1.47 × 10^3 mg a.i./kg
Low toxicity (> 500 mg a.i./kg)

Rattus norvegicus
LD_{50} (14d) > 5.0 ×10^3 mg a.i./kg
Slight toxicity (> 5000 mg a.i./kg)

3.2 National Unified Prevention and control

Unified Approach:

- short time to control target disease and insects, to avoid spreading
- Government-funded, Unified organization, technology, pesticides, prevention time, the scale and professional level of pest and disease control are greatly improved , good control efficiency and reduce pesticide use.

3.3 Subsidies for Bio-control and Bio-pesticide by Nation

☐ Government Support:

- **Government subsidies for low-toxicity bio-pesticides to encourage farmers to adopt green control technologies, to reduce the risk.**

✓ **Bt (Bacillus thuringiensis) - A microbial pesticide widely used to control insect pests.**

✓ **Matrine - A plant-derived pesticide extracted from the roots of Sophora flavescens.**

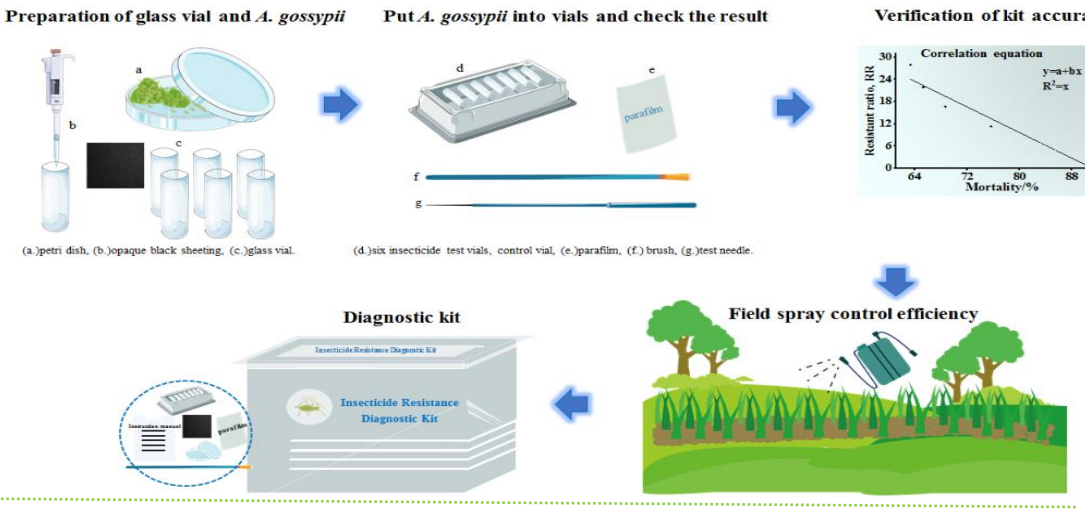
✓ **Beauveria bassiana - A fungal-based biopesticide used to control various insect pests,**

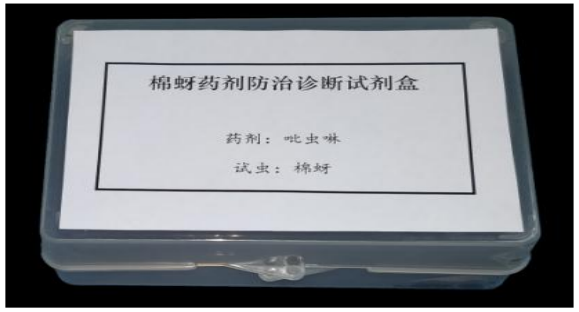
3.4 Develop low-risk application techniques and supporting equipment

1) Precise selection technology reduces risk of pesticide

Dr. Cui Li: A test kit for testing the resistance sensitivity levels of target organism to insecticides and fungicides, help precise selecting the correct pesticide to achieve high efficacy and reduce pesticide use.

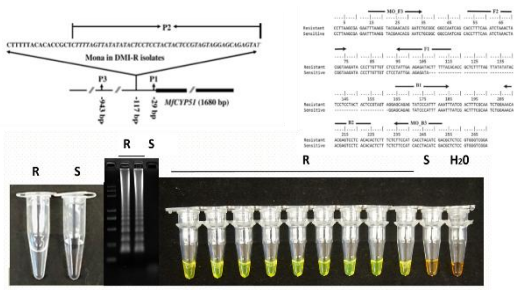
rapid pesticide selection kit for cotton aphid control



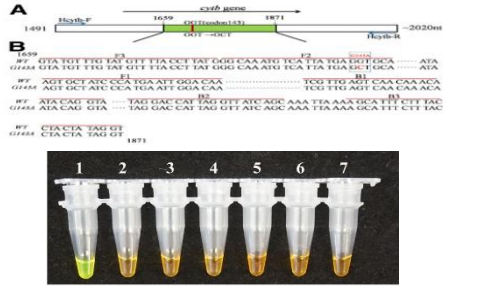


rapid pesticide selection kit for Botrytis cinerea control

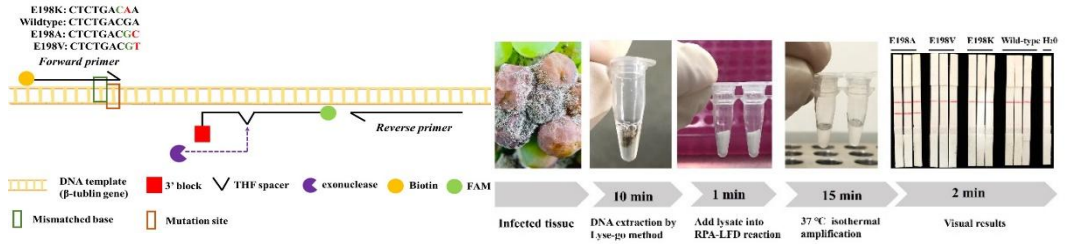
LAMP-based DMI resistance detection



LAMP-based QOI resistance detection



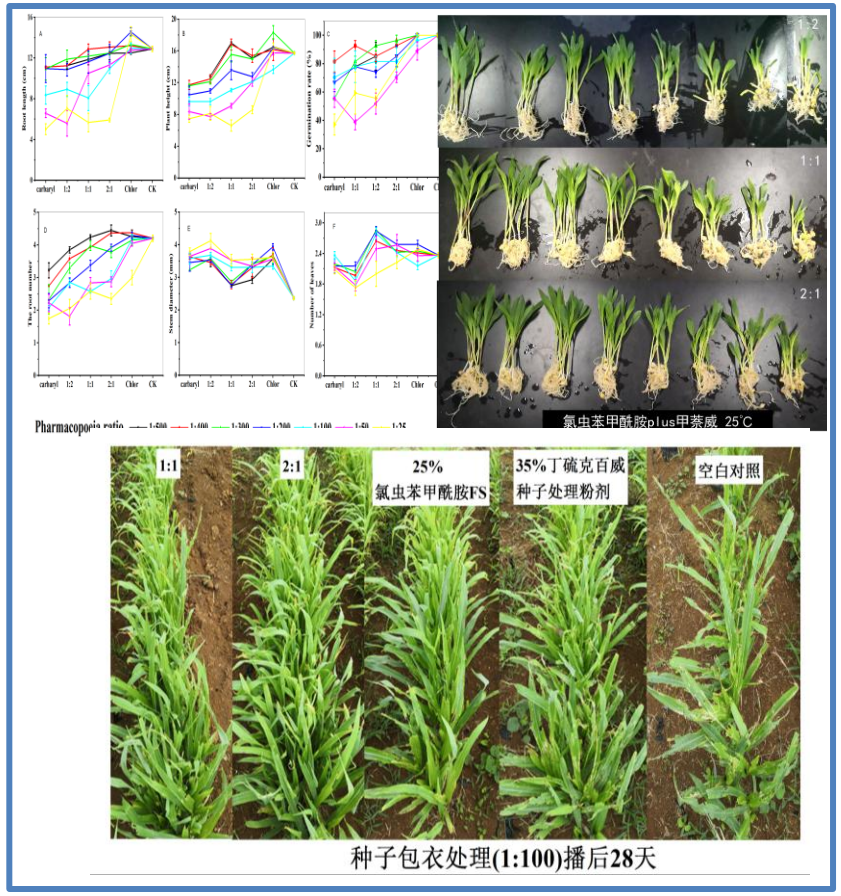
基于RPA的MBC抗药性检测



Achieve real-time field detection, with results available in just 30 minutes from sample collection to detection. Test kit

2) Pesticide precision control technologies to reduce the risk of pesticide drift.

Dr. Yang. Developed precise control technologies such as seed coating technology and granular application as a substitute for droplet spraying, to effective control of Fall Armyworm, protecting natural enemies and ensuring environmental safety.



3) Develop soil fumigation technology and equipment to reduce occupation risk

Develop soil fumigation technology and equipment: For highly volatile pesticides such as dimethyl disulfide, methyl bromide, and Vapam, injection, capsule, soil mixing, and band application techniques developed. small-scale pesticide application equipment was created to address the occupational health risks associated with exposure to high volatile pesticides

injection application

Zone application

capsule

Soil mixing

irrigation

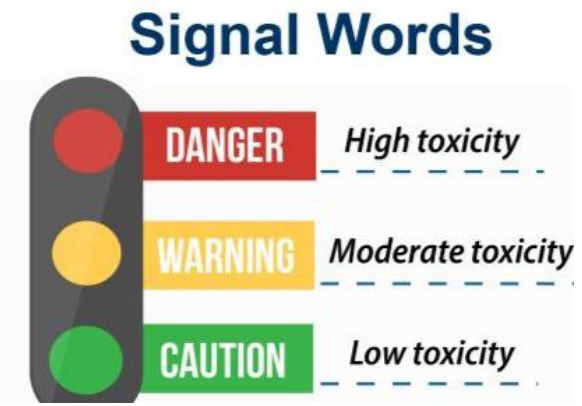
Bio fumigation

Small equpments

3.5 Scientific Management of Pesticide

1) Banning and Restricting High-Risk Pesticides:

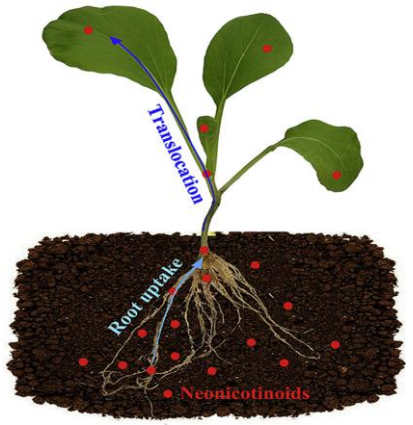
- **completely banned** the use of highly toxic organophosphorus pesticides such as methamidophos and parathion.
- **Restrictions** high risk pesticides use in vegetable and fruits, like carbofuran and omethoate; **Phosphine aluminum**, as a high-risk pesticide used for pest control in granaries, is strictly restricted in its use and is required to be managed and operated by professionals;

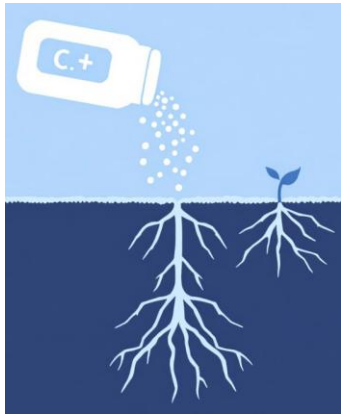


3.5 Scientific Management of Pesticide

2) Managed High-Risk Granular Pesticide Formulations:

- **Restriction:** Granules applied to the soil result in less than 2% of the pesticide being absorbed by the above-ground parts of plants, leading waste and contaminating, **prohibiting registration Products** for their control for above-ground pests.





3.5 Scientific Management of Pesticide

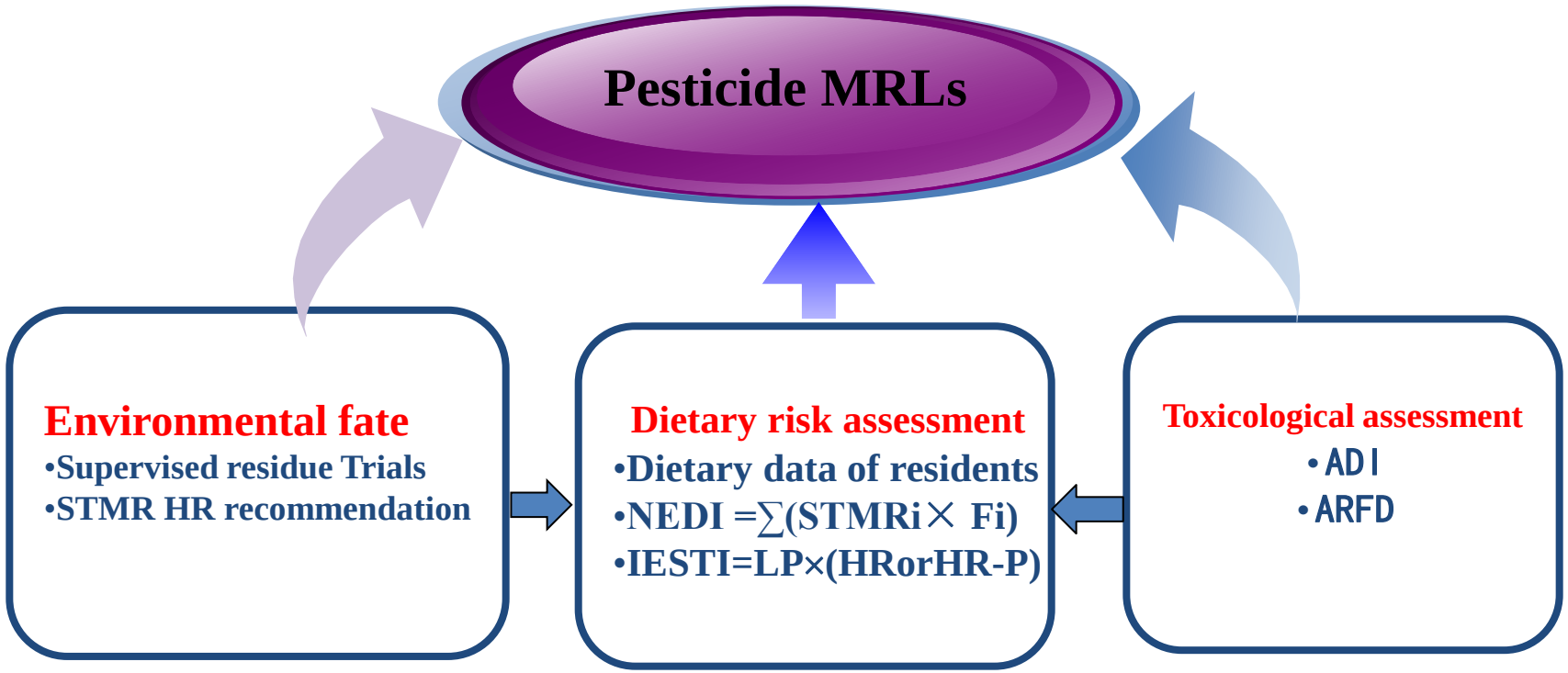
3) Pesticide Registration for Minor Crops:

- **Simplified Procedures:** Simplified registration procedures for minor crops.
- **Recommended Lists:** Issued temporary recommended pesticide lists, catering to specific crop needs.

3.6 Establish standards to control the impact of pesticide risks

Established National MRLs to provide reference for supervision and enforcement :

- Established over 13,000 pesticide residue limits, covering 560+ pesticides and 300+ agricultural products

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GB

中华人民共和国国家标准

GB 2763—2021

代替 GB 2763—2019

食品安全国家标准
食品中农药最大残留限量

National food safety standard—
Maximum residue limits for pesticides in food

2021-03-03 发布　　2021-09-03 实施

中华人民共和国国家卫生健康委员会
中华人民共和国农业农村部 发布
国家市场监督管理总局

4. Key Achievements

1) Chinese Pesticide products are safer: The proportion of highly toxic pesticides in pesticide products dropped to less than 1%, while that of low-toxicity pesticides exceeds 80%.

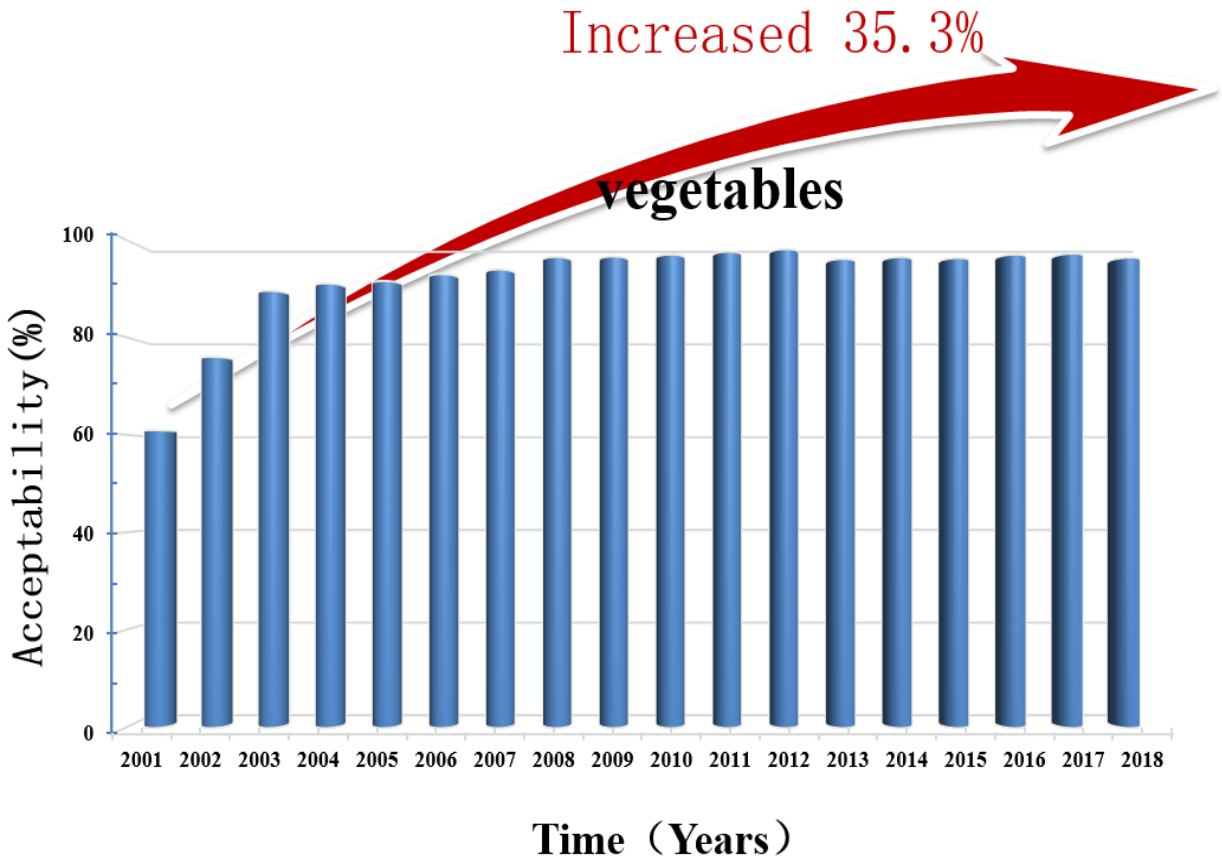
2) Green control Rate and Coverage improved: The coverage rate of green pest control has reached 54%, and the coverage rate of unified prevention and control has reached 45%.

3) Consistent Reduction in Pesticide use: Since 2015, with the widespread application of green plant protection technologies, the amounts of pesticides used has continued to experience negative growth, effectively reducing the risks associated with pesticides.

4) Good Market Monitoring Compliance Rate for Agricultural Products :

- **Pesticide residue compliance rate in agricultural products stabilized at over 97% recent 10 years.**

- **It also indicates that Pesticide residue risks were well controlled in China.**



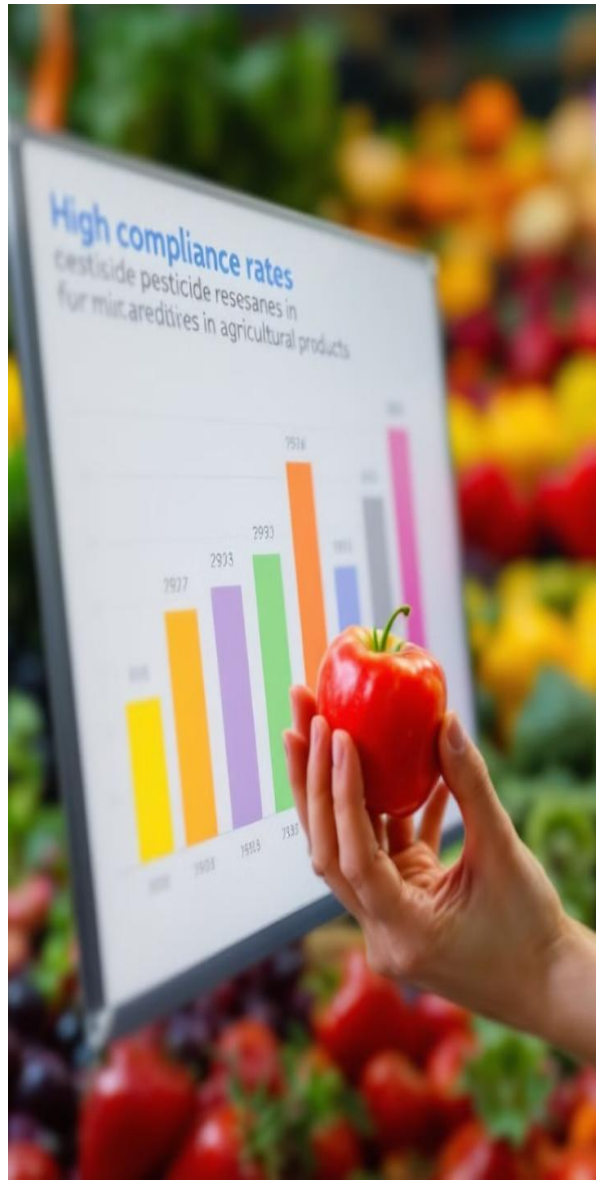
Pesticide residue monitoring Level in foods in China

4. Future Plans

1) Optimizing Pesticide Management : Identification and control the risk of pesticide, Strengthen control over high-risk pesticides and optimize registration.

2) Promoting Green Control Technologies : Promote integrated pest management to reduce pesticide use.

3) Strengthen international cooperation: promote global exchange of pesticide risk management experiences and technical collaboration, and ensure the quality and safety of global agricultural products as well as the security of the ecological environment..



Thanks for your attention

Look forwarding to having a good cooperation