STRATEGIC APPROACHES TO PESTICIDE TESTING IN PRODUCE

An industry **White Paper**

SUPPORTED BY:

Agrolab

AFFI AMERICAN FROZEN FOOD INSTITUTE

ABOUT THIS PAPER

This white paper was developed by a group of volunteer subject matter experts to equip stakeholders in the agricultural industry with a guidance regarding pesticide testing, addressing factors like necessity, timing, methodologies, and actionable insights in response to violative findings. CYCAT LLC supported the editors in the development of this white paper. CYCAT LLC is affiliated with Agrolab Mexico, the largest testing lab in Mexico, who has partnered with the American Frozen Food Institute (AFFI) to re-release the white paper in 2026.

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DISCLAIMER

These guidelines provide recommended food safety practices that are intended to address regulatory risks associated with pesticides in the US marketplace. This paper addresses areas identified by an industry working group with diverse stakeholder input. It does not address every known hazard, singular, or cumulative risk factors. It is expected that growers are following the minimum food safety standards as they pertain to production practices as laid out by the FDA's 21 CFR 112 Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption (i.e., the FSMA Produce Safety Rule), as applicable 21 CFR 117 Hazard Analysis and Risk Based Preventive Controls for Human Food (i.e., the FSMA Preventive Controls Rule), as well as those required local, state, or federal regulations. The information provided herein is offered in good faith and believed to be reliable, but is made without warranty, expressed or implied, as to merchantability, fitness for a particular purpose, or any other matter. These recommended guidelines were not designed to apply to any specific operation. It is the responsibility of the user of this document to verify that these guidelines are appropriate for their operation. The publishing organizations and contributors do not assume any responsibility for compliance with applicable laws and regulations. It is recommended that users consult with their own legal and technical advisers to be sure that their own procedures meet applicable requirements.

Throughout this document, the word “must” is used to designate practices, policies, and procedures that are required by regulation. The word “should” is used to designate recommendations that operations should consider using and are accepted by the US-based produce industry as best practice.

Any references to commercial products, services or websites are made based on the authors’ experiences and are provided without warranty. Readers should properly assess each service prior to engaging in a business relationship.

ABOUT Agrolab Mexico

Agrolab México is the parent company of CYCAT and is an ISO/IEC 17025–accredited and part of the FDA’s LAAF framework. Agrolab México operates a 30,000+ ft² laboratory with 25+ collection offices, serving 6,000+ clients with A2LA-accredited testing and multi-year ema recognition. The lab delivers LC-MS/MS and GC-MS/MS multi-residue pesticide analysis (600+ analytes) and accredited scopes from mycotoxins and microbiology to metals, water, and environmental matrices—supporting compliance and elevating food safety across sectors and countries.

ABOUT FOOD SAFETY STRATEGY LLC

Food Safety Strategy, LLC is a consulting firm founded by Dr. Jennifer McEntire that develops critical thinking skills within the food industry and facilitates action-oriented initiatives that impact public health. The firm brings expert understanding of food safety regulations, hazards, risks, and effective ways of managing them to help food companies and food system stakeholders look beyond regulatory compliance and passing audits and better prepare for the food safety challenges of tomorrow. And if things go wrong, we are here to provide food safety crisis support. We help clients get strategic about food safety.

ABOUT AFFI

The American Frozen Food Institute is the member-driven national trade association representing all segments of the frozen food supply chain from manufacturers to suppliers and distributors. AFFI advocates before legislative and regulatory entities on the industry’s behalf, serves as the voice for the industry and convenes industry leadership to create an environment where frozen foods are essential in a dynamic marketplace.

INTRODUCTION

This paper focuses on factors that influence testing raw agricultural commodities (RACs), such as fruit and vegetable, for pesticides and responding to violative pesticide test results in the United States (US). It briefly touches on the mechanics of pesticide testing but does not address which pesticides can be used on specific crops (review the Crop Data Management Systems (CDMS) https://www.cdms.net/). Links to key terminologies and regulatory requirements are provided, since the regulations influence the actions taken when violative finding(s) occur. The goal of the paper is to encourage members of the food industry, specifically US producers and importers of RACs, to think critically when determining how to address an unexpected finding.

SCOPE & TERMS

- The scope of this paper is limited to testing produce RACs and excludes testing of soil as well as processed and/or manufactured products that may use the RAC(s) as an ingredient.
- The terms used in this paper align with "Demystifying Pesticide Testing: Key Terminologies Explained & Why You Should Care" | LinkedIn.
- This paper is intended as a guide for produce growers in the US selling product domestically or for export markets. It may also be useful for those outside the US who are exporting to the US, importers of produce into the US, or buyers of produce with markets in the US.
- This white paper was developed by a group of volunteer subject matter experts to provide produce producers with guidance regarding pesticide testing by addressing key considerations such as: the necessity of testing, what triggers pesticide testing, the importance of selecting the right laboratory, suitable methodologies, and subsequent actions based on pesticide test results (including insights to handling violative results). This white paper is intended to empower producers to make informed decisions that prioritize safety and regulatory compliance for agricultural operations.

BACKGROUND

Pesticides, whether chemical substances or biological agents, serve a critical role in an Integrated Pest Management (IPM) program in managing pests that threaten crops, transmit diseases, and/or cause nuisance. Pesticides are extensively utilized in agriculture to safeguard crop yields, spanning both conventional and organic farming methods. Classified into categories such as insecticides, herbicides, fungicides, rodenticides, and bactericides, pesticides can be synthetic chemicals or naturally derived compounds. Application methods vary, tailored to the specific targeted pest(s) and environmental conditions. Despite their utility, pesticides carry risks due to their potential toxicity, necessitating stringent regulatory oversight for approval to ensure safety. This process serves multiple purposes, including regulatory compliance, consumer safety, and maintenance of product quality standards. Governmental agencies establish tolerances, also referred to as maximum residue limits (MRLs) for pesticides on food items to protect consumers and the environment. The tolerances/MRLs are established based on safety and data from dietary risk assessments which demonstrate that use of the pesticide will have "reasonable certainty of no harm." (Vannoort, 2001). The risk assessment considers data such as the toxicity profile of the pesticide and breakdown products, how much pesticide is applied and frequency of use, residues on food commodities, and exposure from multiple sources (e.g., water, food, etc.). Compliance with these regulations is mandatory for producers and distributors to avoid legal repercussions and uphold industry standards.

Adherence to Good Agricultural Practices (GAPs) minimizes pesticide residues in produce. GAPs should include a robust IPM program and guidelines for the use of pesticides, including proper application (rates and timing) and methods to minimize residues. Following GAPs reduces the likelihood of exceeding MRLs. Notably, the FDA Produce Safety Rule focuses on biological hazards primarily, not chemicals such as pesticides. Still, all producers must comply with the Federal Food Drug and Cosmetic Act, which prohibits adulterated foods (including those with violative pesticide residues) from entering commerce.

The first step to ensure an operation is within the legal limits of an approved chemical for a specific crop is to have an Integrated Pest Management (IPM) program in place. IPM programs are a comprehensive approach to pest management, preventing disease, insects, rodents, etc. An IPM program should include use of a certified pesticide applicator, monitoring, record keeping, and verification of proper usage when any chemicals are applied. An IPM program aids in reducing the likelihood of exceeding MRLs in produce. Through continuous monitoring and identification of pest populations, IPM allows for early detection and targeted interventions, minimizing the need for chemical pesticides that may contribute to residue levels. Employing preventive measures like crop rotation and sanitation, along with biological controls such as natural enemies and selective pesticides, enables growers to manage pests effectively while mitigating the risk of exceeding MRLs. By emphasizing mechanical and cultural controls alongside environmentally and economically sustainable practices, IPM programs reduce reliance on chemical interventions, thus lowering the presence of pesticide residues in fruit and vegetable commodities. Pesticide testing can be used to verify that the program is working effectively. Pesticides should be the last-resort measure in a complete IPM program. Plans and implementations of mechanisms for the aforementioned controls (e.g., physical barriers, exclusions tactics, traps, among others) should be prioritized.

Only when these control mechanisms prove unsatisfactory or economically infeasible to address the pest issues thoroughly are pesticides recommended.

Pesticides may decompose with time, thus preharvest intervals (PHIs) are often established for specific pesticides. PHIs are the minimum amount of time that must pass between the last pesticide application and crop harvest. PHIs are estimated using pesticide dissipation models resulting from studies conducted in varying environments. The repeatability of such conditions may be difficult across different field environments, resulting in variability (Nguyen et al., 2019). Food Safety Standards specialized in produce (PrimusGFS, CanadaGAP) cite the monitoring of PHIs as a best practice to achieve the Food Safety Objectives of MRLs. Information about pesticide properties (e.g., dissipation rates, curves, RL50s) can be helpful in evaluating risks. This information can be obtained from several sources including the Pesticide Properties Database and the Food and Agricultural Organization (FAO) Pesticide Registration Toolkit under pesticide properties, among others.

US REGULATORY SURVEILLANCE

Despite the industry's implementation of IPM and adherence to GAPs, residues in excess of regulatory limits may be found. Most developed regions like the United States and Europe have governmental pesticide residue monitoring programs, which includes domestic and imported materials (for example in the US: Pesticide Residue Monitoring Program Reports and Data (US FDA) and Pesticide Data Program Annual Summary Reports (USDA); in Europe: European Union Report on Pesticide Residues in Food). The most recent report (2022) from the USDA for both imported and domestic produce observed over 99 percent of the samples tested had residues below the tolerances established by the US EPA with 27.6% having no detectable residue. Residues exceeding the tolerance or without established tolerance, per 40 CFR 180 were detected in 0.53% (n=56) of the total 10,655 samples tested. Of these 56 samples, 19 were domestic (33.9%) and 37 were imported (66.1%). Additionally, 269 samples were found to contain pesticides for which no tolerance had been established. Surveillance data is also available from the World Health Organization Pesticide Residues in Food Report and the FAO Reports and Evaluations on Pesticide Residues.

TRIGGERS FOR PESTICIDE TESTING

Testing, including for pesticide residues, should be used to verify that a food safety management system is working and to ensure regulatory compliance. Testing may be used in several ways, including:

- To verify that an IPM is utilized correctly
- To comply with customer requirements
- For investigations when alerted to a potential issue or something unusual has occurred at the farm, such as flooding or neighboring farms applying pesticides to crops close by, especially on windy days.
- To ensure a crop to be exported complies with regulations for a specific country
- To adhere to the requirements of a food safety system, regulation, and/or audit scheme

An assessment of pesticide residue violations can help inform producers around situations that may influence the utility of testing. When considering the value of testing, there are several factors that producers may consider (Figure 1), which are described in more detail below.

FIGURE 1.

FIGURE 1. FACTORS TO EVALUATE WHEN CONSIDERING IF PESTICIDE TESTING IS NECESSARY FOR PRODUCERS.

HAVE PESTICIDES BEEN APPLIED TO THE PRODUCE?

Almost all producers use some type of plant protection products. This includes insecticides, fungicides, and herbicides, amongst others. Producers and growers should always operate under the assumption that the produce has been exposed to pesticides. They should maintain a robust IPM program and conduct annual verification, including testing of the farm or area of farms operating under the same management program. Although not in scope of this white paper, other things to consider are pesticide treatment of farm equipment, storage bins, and transportation as these may also come into contact with produce and be the cause of unexpected results.

IS THE PRODUCE INTENDED FOR DOMESTIC SALE OR EXPORT?

Effective communication is essential in reaching this decision. Growers and producers should engage in open dialogues with their marketers or buyers regarding the intended destination of the product. Without knowledge of the product's destination, growers may overlook specific requirements or fail to ask pertinent questions. Utilizing a freely accessible database can provide insights into the Maximum Residue Limits (MRLs) applicable to the destination before cultivation begins. Some farms designate specific fields for export to particular countries. Therefore, if produce cultivated in the USA is destined for South Korea, then the produce must adhere to the MRLs of both countries. Primus GFS and GlobalGAP IFA audit schemes both require pesticide testing if the product is destined for export markets (IFA V 5.4-1 CB 7.6.1 - 7.6.7; PrimusGFS V3.2 2.10.05 - 2.10.06). Similarly, companies that are importing fresh fruits and vegetables into the US should also be mindful of differences in regulations and practices in the growing country(ies), as it may lead to residues on crops that do not meet US requirements. It is prudent to consider the following two questions: (1) where is the produce being grown? and (2) where is the produce going to be sold? This can help determine whether testing to verify regulatory compliance may be useful.

WHAT ARE THE REGULATORY REQUIREMENTS FOR PESTICIDE RESIDUES?

The US Environmental Protection Agency (EPA) sets tolerances, or maximum residue levels (MRLs), for specific pesticide chemicals used in food production for humans or animals. These tolerances are regulatory benchmarks that limit pesticide residue levels and reduce potential health and environmental risks. To determine tolerances of pesticide residues on foods, a combination of factors is included in a risk assessment, which includes concentration of pesticide, level of toxicity of the pesticide and its byproducts, pesticide exposure routes (e.g., inhalation, contact), amount of pesticide residue in food and water, dietary consumption, and frequency of pesticide application. The risk assessment determines the level of potential harm posed by the pesticide residue from all routes of exposure. If the risk is too great (i.e., above a threshold set by toxicity studies), the tolerance may not be set or be modified to where the risk becomes acceptable (e.g., remove certain uses and/or foods from the proposed use). If the risk is determined to be acceptable (i.e., below a threshold determined by toxicity studies), a tolerance is set for the proposed uses and foods. The US EPA has a registration process for pesticides and sets directions on the label about MRLs, and other factors. The overall process is explained in the article: "Let's Keep Our Mazes to Corn Fields... Navigating EPA's Pesticide Registration Process".

The US Food and Drug Administration (FDA) enforces the tolerances established by the EPA. The FDA assesses pesticide residue levels in both imported and domestically produced foods by performing testing activities. However, commodities (e.g., meat, seafood, poultry, etc.) under the jurisdiction of the US Department of Agriculture (USDA) are not subject to FDA testing for pesticide residues (the Food Safety Inspection Service (FSIS) handles those specific foods).

According to the FDA, "It is the legal responsibility of companies that produce and grow foods and manufacture products sold in the U.S. and intended for food use to comply with EPA and FDA regulations. If the FDA finds that the amount of pesticide residue on a food is over the tolerance, or when a pesticide is found and there is no tolerance that has been established, the FDA can act. For domestic food, it may include working with the manufacturer or grower to resolve the issue and if necessary, take steps to prevent the product from entering, or remaining in, the U.S. market. In addition, FDA will notify EPA when FDA investigations or sample analyses reveal pesticide misuse. For shipments of import food commodities containing violative pesticides, they may be refused entry into U.S. commerce. The responsible firm(s) and product(s) may be placed on an import alert under "Detention Without Physical Examination," or DWPE, which may be invoked for future shipments of that firm's commodity based on the finding of a single violative shipment" (FDA Pesticide). Other countries may have similar regulations and enforcement practices.

Tolerances or MRLs should be monitored at a regular frequency by producers and growers as they can change (e.g., decreased, increased, and/or revoked) by the regulatory agencies responsible for setting them.

WERE PESTICIDES APPLIED ACCORDING TO REGULATIONS AND MANUFACTURER INSTRUCTIONS?

Pesticides must be applied by following requirements on the label. Below is an example of a pesticide label for a material that can be applied to strawberries. Using the label, you can find the re-entry interval, PHI, targeted diseases, application rate and other instructions for applications. In addition, restrictions on which states or regions the pesticide cannot be used in are also found on the label (example label below).

Crop	Disease	Product Rate oz/Acre	Remarks
Berry, Low Growing Subgroup 13- 07G (except Cranberry)[1]* Strawberry*	Anthracnose *(Colletotrichum spp.)* Gray Mold *(Botrytis cinerea)* Powdery Mildew *(Sphaerotheca macularis)*	5.5 - 10	Begin application at or before bloom and continue on a 7 - 10 day interval. **Resistance Management:** After 2 applications of **Vango WG**, alternate with another fungicide with a different mode of action for 2 applications.
	Root and Crown Anthracnose at-planting *(Colletotrichum spp.)*	2.5 - 4 oz per 100 gal water	Apply as a pre-plant dip to strawberry roots and crowns at the rate of 2.5 to 4 oz per 100 gal of water for suppression of root and crown rot caused by anthracnose. Wash transplants to remove excess soil prior to dipping. This helps to remove adhering spores from the external plant parts. Completely immerse planting stock in dip solution. Dip or expose plants for a minimum of 2 to 5 minutes. **DO NOT** reuse solution. Dispose of dip solution according to local regulations. Plant treated plants as quickly as possible. For continued anthracnose control, follow with foliar applications beginning 2 - 3 weeks after transplant.
[1] **Additional Low Growing Berries:** Bearberry; bilberry; cloudberry; muntries; partridgeberry and cultivars and/or hybrids of these.			
Application Instructions: Application may be made by ground, air, or chemigation. Good coverage is essential for good disease control. Use a minimum of 5 gallons/A spray volume by air. Make no more than two applications by air. For chemigation, apply in 0.1 - 0.25 inches/A of water. Chemigation with excessive water may lead to a decrease in efficacy.			
Specific Use Restrictions: 1. Make no more than two applications by air. 2. Make only one pre-plant dip application per crop. 3. Do not apply more than 28 oz/A of **Vango WG** (1.3 lb ai/A of cyprodinil) per year. 4. May be applied on the day of harvest (0-day PHI). *Not registered for use in California.			

Growers should utilize pesticide reporting documents as evidence that label guidelines are being adhered to. Below is a sample spreadsheet (USDA AMS) showing the various categories that are tracked:

Restricted Use Pesticide Recordkeeping Form

Name and Certification Number	Application Date*	Brand or Product Name	EPA Registration Number	Size of Area Treated	Rate Per Unit**	Total Amount Applied	Location	Crop

THIS SAMPLE SPREADSHEET IS NOT EXHAUSTIVE, AS OTHER BODIES INCLUDING SOME GFSI AUDIT SCHEMES REQUIRE ADDITIONAL INFORMATION BEYOND WHAT IS LISTED HERE (E.G., TARGET PEST, ACTIVE INGREDIENT, PRE-HARVEST INTERVAL, RE-ENTRY INTERVAL, ETC.).

IS THERE A KNOWN HISTORY OF PESTICIDE-RELATED ISSUES WITH CROPS OR PRODUCTION PRACTICES?

In most instances, growers follow crop rotation practices. When this is the case, consider what crop was previously planted in the growing area and which pesticides could have been applied. Could the pesticides applied previously affect the product grown this season?

ARE THERE CONCERNS ABOUT PESTICIDE DRIFT

Producers should assess adjacent land use, particularly if other crops or livestock are in proximity. Whenever feasible, producers should consider engaging in discussions with neighbors to learn about their spraying practices, including timing and methods, and consider requesting avoidance of spraying during high winds to mitigate drift risks (EPA Pesticide Drift). Some states have wind restriction laws for certain regions. In other cases these specifications are listed on the product's label (for example, "do not spray if winds are more than 10mph"; PRN-X Draft: Spray and Dust Drift Label Statements for Pesticide Products). Additionally, producers may consider assessing whether neighboring farms utilize substances not approved for organic crop labeling if the operation is certified organic. References that may be useful for organic growers include:

- 4013: Maintaining the Integrity of Organic Imports (pdf)4013: Maintaining the Integrity of Organic Imports (pdf)
- 2611-1: Prohibited Pesticides for NOP Residue Testing2611-1: Prohibited Pesticides for NOP Residue Testing
- 2609: Unannounced Inspections2609: Unannounced Inspections (section 4.1.8)

If the decision is made to conduct MRL testing, samples should be selected as close to the adjacent growing operation as possible to give an indication of potential drift. It should be communicated to the testing lab what commodity is being produced/grown nearby, so they can focus on chemicals that are commonly used in that area.

SELECTING A LABORATORY FOR PESTICIDE TESTING

CHOOSING THE RIGHT LAB

First and foremost, there should be an open conversation with prospective laboratories to make sure they can support the needs of the operation (i.e., what happens when there is a violative test result?). A laboratory should have ISO 17025 accreditation and use globally approved methods (AOAC). This accreditation shows that a lab (personnel and equipment, etc.) has been assessed by a third-party and is competent to carry out testing activities. Additionally, operations should work with the pesticide-testing laboratory to develop a suitable, representative sampling plan. Plans should consider which commodities are grown, how the IPM program is implemented and frequency of testing.

WHICH PESTICIDES TO SCREEN FOR

Typically, a comprehensive pesticide screening test for produce covers over 300 chemicals, although the specific compounds included may vary among different laboratories. While there may be circumstances where one would opt for testing specific chemicals due to known issues, the general screening test is usually the preferred approach. It's advisable to inquire with the chosen lab about the regulatory agencies they reference in their reports. The report should encompass not only the tolerances set by the US, but also those of any other countries to which it is intended to be shipped. The lab will provide results of testing. Ultimately the producer interprets the results and makes decisions. Even if the lab provides a cover sheet highlighting any instances where the produce exceeds tolerance levels for specific chemicals or countries requested to be included in your report, it is up to the producer to verify and act on this information.

If the decision is made to conduct MRL testing, samples should be selected as close to the adjacent growing operation as possible to give an indication of the potential of drift. It should be communicated to the testing lab what commodity is being produced/grown nearby, so they can focus on chemicals that are commonly used in that area.

BELOW ARE SOME QUESTIONS TO CONSIDER WHEN EVALUATING A LABORATORY AND DETERMINING THE SCOPE OF THEIR ANALYSIS:

1. What are the default limits for action levels with respect to regulatory compliance?
2. Does testing align with approved pesticides as stipulated by the US EPA and global regulations?
3. Do testing protocols meet regulatory requirements?
4. When is it preferable to conduct comprehensive testing compared to targeted testing?
5. How many molecules should be tested to meet regulatory standards and business needs?
6. What factors should be considered when deciding whether to test for a broad spectrum or specific materials?
7. Are the pesticides being evaluated approved specifically for the crop, or are they more broadly approved?
8. How is the cost-effectiveness of testing balanced with the need for thorough or specific analysis?
9. What are the differences between screening and confirmatory methods in pesticide residue testing?
10. When are presence/absence methods preferred over quantitative methods in testing pesticide residues?
11. Are pesticide residue kits appropriate for testing purposes for regulatory compliance?
12. What are the limits of quantification (LOQ) and limits of detection (LOD) for the pesticides tested for?

ADDRESSING A VIOLATION

There are several ways a company may learn that one or more pesticide residues have been found in levels that exceed regulatory requirements.

YOUR TEST RESULT

A producer may decide, based on the factors in Figure 1, that it's appropriate to test their product. Before a test result comes back violative, it is important to develop a response strategy or next steps. Determining whether a product remains in the marketplace is important in navigating potential regulatory issues. If testing reveals a concerning issue with a product, it's advisable not to release it into commerce and place it on hold. This approach allows for root cause analysis and a thorough investigation to resolve and/or prevent the issue. However, if the product has already entered the marketplace, the severity of the issue will dictate whether a recall is necessary, categorized as Class II or III depending on factors such as levels, approval for similar products, or degradation considerations. If it's not clear if a recall is needed, companies should contact their trade association, a food law attorney, food safety expert, or their local FDA recall coordinator. If a recall is deemed necessary (even if only a Class II or III), FDA will need to be alerted. By promptly addressing such situations, companies can mitigate risks to consumer safety and maintain regulatory compliance. A pesticide testing laboratory should be able to serve as a resource as well.

REGULATORY FINDINGS

Within pesticide regulation and enforcement, multiple agencies share responsibilities, with the EPA primarily setting standards for pesticide residues. The FDA inspects imported food products to ensure adherence to established tolerance levels. In cases where residues surpass permissible limits, the FDA may employ measures such as Detention Without Physical Examination (DWPE) and issue Import Alerts to prevent non-compliant products from entering the domestic market, thereby safeguarding consumers against potential health risks. Additionally, some State Agencies in the US actively monitor pesticide residues on domestically produced fruits and vegetables by conducting routine inspections and residue screenings. It is essential to recognize that various countries maintain their own MRL standards, necessitating awareness of destination country regulations. The approach each country takes when there is a violation also varies and a pesticide expert should guide you. For those exporting from the US, access to a pesticide database is available for free, facilitated by the USDA and managed by Food Chain ID. This resource is a valuable tool for navigating international MRL requirements (Maximum Reside Limits Database).

When confronted with violative test results, consider if there might be degradation over time. Some pesticides naturally break down, potentially influencing reproducibility of findings. Time, therefore, can serve as a critical factor in determining appropriate responses to exceedances of MRLs. For example, Farha et al. (2016) reviewed factors influencing pesticide dissipation patterns in environments. Although some forms of subsequent food processing may also destroy or denature a pesticide, such that the finished product is not violative, shipping

adulterated product is not permitted in the US so the reliance on subsequent processing should be considered with extreme caution (Kaushik et al., 2009; Dordevic and Durovic-Pejcev, 2016).

The detection of unapproved pesticides poses a notable challenge when there is a lack of a designated MRL for a specific crop in the US. Unlike other countries that set a de minimis tolerance in the absence of regulatory approval, the US does not. This should be communicated to producers outside the US who are sending product to the US market. Detection of a pesticide that lacks an MRL is considered a violation, regardless of level. A thorough investigation can assess whether the detected pesticide could be a degradation product of an approved pesticide, necessitating a nuanced grasp of chemical transformations and metabolic pathways, and understanding the definition of the pesticide residue in the country of interest.

CONCLUSION

This white paper provides guidance to producers aid in understanding regulatory requirements for pesticide residues and to think about how to approach pesticide testing, if appropriate. Considerations on selecting a laboratory partner and responding appropriately to violative pesticide residues were also provided. By adhering to Good Agricultural Practices (GAPs) and Integrated Pest Management (IPM) programs, producers can minimize the presence of pesticide residues and reduce the risk of regulatory violations. This white paper emphasizes the importance of critical thinking and proactive measures in addressing pesticide residue issues. Producers are encouraged to engage in monitoring, utilize certified laboratories for testing, and develop robust response strategies for handling violative results. As buyer expectations and the regulatory landscape evolves, it is important to stay informed. Thus, stakeholders navigating the intricate landscape of pesticide regulation must possess a comprehensive understanding of detection protocols, risk mitigation strategies, and associated cost implications to navigate this regulatory terrain effectively.

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