Using Residue Testing as a Fraud Prevention Tool

Organic is a process claim: it certifies how a product was grown or handled, not what's in the finished product itself. In most cases, certificates and paperwork are what stand behind that claim, but they only verify that a supplier is certified — not what's actually in the product. In unique situations, verifying the claim itself requires testing. Analytical testing is the one verification tool that evaluates the product rather than the paper trail behind it. This article explains the difference between your certifier's testing and your own, what you can test for, how to build a risk-based testing program, and what to do when a result is not what you expected.

What You'll Learn

- **The difference between certifier-initiated residue testing and the testing you run yourself.**
- **Three things handlers most often test for: prohibited pesticides, GMO material, and heavy metals.**
- **NOP's use of EPA tolerance thresholds.**
- **What a positive GMO result does and does not mean under a process-based standard.**
- **How to set testing frequency, take a representative sample, and choose a laboratory.**
- **What to do when a result is not what you expected.**

A supplier's organic certificate confirms that the supplier is certified. It doesn't tell you whether the shipment on your dock was treated with a prohibited pesticide during transport. The USDA organic regulations require an NOP Import Certificate for organic imports, with both exporters and importers verifying that the product hasn't contacted a prohibited substance or been treated with ionizing radiation. Many supply chains add further paperwork on top of that, like fumigation or non-fumigation affidavits, but these attestations are self-reported and don't involve an independent check of the shipment itself. Residue testing is a verification tool that evaluates the product itself, and for the highest-risk ingredients in a supply chain, it can answer questions that paperwork alone cannot.

Handlers often conflate their own testing with their certifier's, or read more into a single result than the regulations support. This article separates the two paths to testing, explains what you can test for and how the NOP interprets the numbers, and walks through building a testing program that starts from the risk picture in your organic fraud prevention plan.

TWO PATHS TO TESTING: CERTIFIER AND HANDLER

The USDA organic regulations require certifying agents to conduct periodic residue testing of the products from the operations they certify. Each certifier must test samples from at least 5 percent of the operations it certifies every year, and a certifier with fewer than thirty clients still tests at least one.[1] Certifiers select operations at random, or focus on higher-volume products, products more likely to carry residues, or operations under investigation.[2] The samples may be analyzed for prohibited substances, GMO material, contaminant metals such as arsenic, hormones, or antibiotics.[2] As a certified handler, you do not schedule this testing and you cannot opt out of it. Your role is to cooperate when the inspector arrives to collect the sample.

The samples are processed by an accredited laboratory. The certifier keeps the results on file and makes them available to the public upon request, unless they become part of an ongoing compliance investigation. Any residue that exceeds a federal regulatory tolerance is reported to the appropriate federal and state agencies.[1]

The testing covered in the remainder of this article is a different process: analytical testing that you order, on ingredients you choose, as a mitigation measure in your own fraud prevention program. It is voluntary, risk-based, and entirely within your control. Testing is one of the verification tools a handler can assign to the high-vulnerability points in its supply chain.[3]

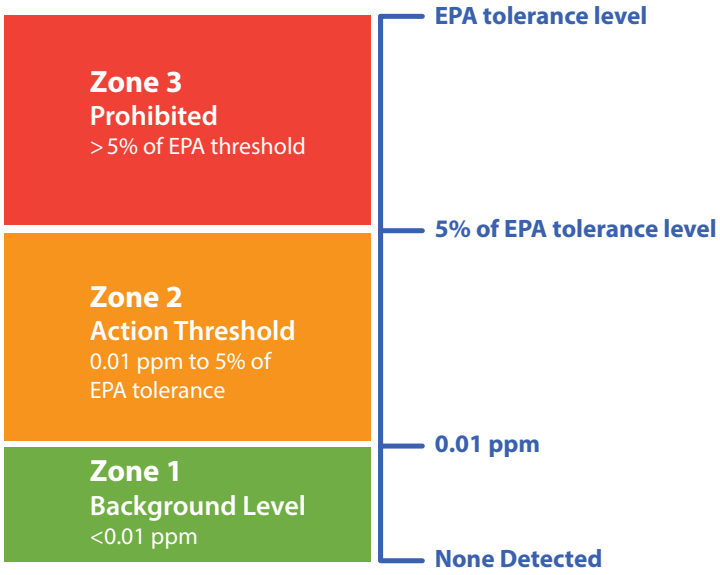
	Certifier Testing	Handler Testing
Who Initiates It	Certifying Agent	You
Regulatory Basis	Required by 7 CFR §205.670 At least 5% of certified operations tested each year	Voluntary A monitoring and mitigation measure in your fraud prevention plan permitted by 7 CFR §205.201(a)(3)
Frequency and Selection	Certifier selects what and when Can be random, or influenced by factors such as higher-volume, residue-prone, or under investigation	You decide based on your vulnerability assessment
How Results Are Handled	Certifier notifies you and retains results May open an investigation Available to the public upon request	You interpret, investigate, take corrective action, and notify your certifier of concerns Results reviewed at your annual inspection

PROHIBITED SUBSTANCES

Most handler testing programs start here. A multi-residue screen using the QuEChERS method detects hundreds of pesticide compounds in a single analysis and quantifies them down to 0.01 ppm.[3] A good starting point is with NOP 2611-1, the target analyte list of about 180 prohibited pesticides that certifiers screen for in their own testing programs. It is a list of what to look for; it does not set tolerances.[4] The resource is older and does not contain all pesticides that may be in current use. Work with your selected laboratory to identify which compounds are appropriate for determining organic compliance for your sampled product.

Detection of a substance, by itself, does not determine the product's organic status. The EPA establishes pesticide tolerances by commodity in 40 CFR Part 180.[5] The USDA organic regulations draw the line at less than or equal to 5 percent of the EPA's tolerance for the specific residue detected or unavoidable residual environmental contamination. If the product tests at greater than that 5 percent threshold, it must not be sold, labeled, or represented as organic.[6]

Interpreting Pesticide Residue Results



NOP 2613 Guidance Document instructs certifiers on how to act on pesticide residue results. It is the best guide for reading and interpreting your own test results.[7] The framework has three zones:

- **Below 0.01 ppm:** the certifier notes the result and assesses why the residue is present. The product may still be sold as organic.
- **At or above 0.01 ppm and at or below 5 percent of the EPA tolerance:** the certifier investigates the source. If the residue did not come from a prohibited application, the product may still be sold as organic, though the operation may receive a noncompliance for its contamination prevention practices.
- **Above 5 percent of the EPA threshold:** the product may not be sold, labeled, or represented as organic. Results above the full EPA tolerance are also reported to the appropriate federal and state agencies.

Two edge cases are worth knowing. For persistent legacy pesticides such as DDT, which have no current tolerance, certifiers apply FDA action levels in place of 5 percent of the EPA tolerance. If a detected pesticide has no EPA tolerance and no FDA action level, a result above 0.01 ppm means the product may not be sold as organic at all.[7]

Testing also has practical limits. Pesticide residues can volatilize during heat processing, so testing a roasted or heat-treated product may come back clean regardless of what happened in the field. Therefore, it is best practice to sample the raw ingredient instead.[3] And for some fumigants, including methyl bromide and the phosphide fumigants, no reliable residue test exists.[3]

GMO MATERIAL (EXCLUDED METHODS)

Two test families cover most needs. Lateral flow strip tests and ELISA methods detect the novel proteins in genetically modified crops at roughly 0.01 to 0.1 percent, suitable for quick screening at receiving. PCR methods detect the modified DNA itself down to about 0.01 percent and are the standard for confirmation.[3]

Testing makes sense only for ingredients with a commercially grown genetically modified counterpart: corn, soybeans, canola, sugar beets, alfalfa, cotton, papaya, and summer squash lead the list.[3] Testing imported wheat for GMO material, for example, spends money screening for a crop with no commercial genetically modified version on the market.[3] Heat processing degrades both proteins and DNA, so testing a heat-processed or refined ingredient may return a false negative even if the raw input was genetically modified. Test the raw ingredient before processing.[3]

Under the organic regulations, a positive GMO test result triggers an investigation rather than an automatic finding of noncompliance. The USDA organic standard is process-based, meaning it verifies and certifies the processes and practices used in production of organic agricultural products. What certifiers look at is whether excluded methods were intentionally used in production, not whether GMO material is detectable in the finished product. NOP Policy Memo 11-13 explains how certifiers weigh GMO test results against that standard.[8] Your certifier will assess whether the contamination came from intentional use of excluded methods or from contact with conventional material at a shared facility or during transport. Hold the product, document the finding, and work through the process with your certifier.

HEAVY METALS

If your operation handles ingredients where soil contamination is a meaningful risk, heavy metals are worth adding to your testing scope. Arsenic, cadmium, and lead are the three most commonly screened. Inductively coupled plasma mass spectrometry (ICP-MS) is the standard method and quantifies all three in a single analysis.[3]

Priority ingredients include rice and rice products (arsenic), root vegetables such as carrots and beets (lead and cadmium, absorbed from soil), and cocoa and chocolate products (cadmium, prevalent in some growing regions).[3] Unlike the NOP's pesticide threshold framework, there is no organic-specific tolerance for heavy metals. Certifiers and buyers typically compare results against FDA guidance levels, FDA action levels, or the standards in the product's destination market.

WATCH OUT

Heavy metals can be present in organically grown crops even when farming practices are fully compliant, because plants absorb metals from soil. A positive heavy metals result is not necessarily evidence of fraud. It may reflect regional geology, soil legacy, or irrigation water quality. Hold the lot and investigate the source before drawing conclusions about organic integrity.

BUILDING YOUR TESTING PROGRAM

Handler-initiated testing is most effective when it is targeted, and targeting requires a risk picture. Residue testing belongs at the points where other verification tools have limited reach: high-volume commodities where organic price premiums are significant, ingredients with commercially grown genetically modified counterparts, and suppliers who recently transitioned to organic production.

Your Organic System Plan is where your testing commitments become official. You are not required to include testing in your monitoring protocol, but if you do, you will be required to see it through. Your certifier expects to see a description of your testing practices in your fraud prevention documentation, and your testing records are reviewed at your annual inspection.[9] Whatever program you build, document it in your OSP and keep records of every result.

Testing Frequency

There is no regulatory frequency for how often handler-initiated testing must occur, so frequency comes from your own risk analysis. A practical starting point: test the first three to four shipments from any new supplier before relaxing to periodic monitoring. For established suppliers of high-risk ingredients, quarterly testing is common. Lower-risk ingredients in stable supply relationships may need only annual confirmation.[3]

Sampling

A result is only as good as the sample. A grab from the top of a container is not representative of the lot. Follow the sampling instructions your laboratory provides and document the chain of custody from sample collection through analysis. If your operation already has a HACCP or FSMA food safety sampling plan, use it as your template for coverage and documentation format. Be sure to follow your laboratory's instructions for preventing cross-contamination of the sample. It is easy for the integrity of a sample to be compromised by materials common to offices and facilities.

Lab Selection

Use a laboratory with ISO/IEC 17025 accreditation for the specific methods you are ordering. Accreditation means the lab's methods, equipment, and personnel have been independently audited against that standard. Request the lab's scope of accreditation and confirm that the analytes you need are listed within it.

WATCH OUT

When your lab report arrives, look for the limit of detection (LOD) and limit of quantification (LOQ) for each compound tested. A result of "not detected" means nothing was found above the LOD. The lower the LOD, the more confident you can be that a clean result reflects a clean product. If a report does not include these values, ask the lab for the method's performance specifications.

WHEN A RESULT IS NOT WHAT YOU EXPECTED

When a lab report shows a pesticide residue above 0.01 ppm, you've triggered the action threshold and it is time to initiate your response protocol documented in your organic fraud prevention plan. The specific steps that you design for your response protocol should fit your operation's structure and supply chain. In general, your response to a test result above the action threshold should include the following steps:

1. **Quarantine the Product:** Do not sell, move, or further process the product. Quarantine the shipment and preserve documentation while the situation is assessed.
2. **Document What You Observed:** Record the lab result, the date, lot number, all information about the product, the source and their certification information, transportation and storage information, all communications with your certifier and supplier, and the final disposition of the lot.
3. **Notify Your Certifier:** Contact your certifying agent before drawing conclusions. Your certifier has authority to investigate and should be part of any disposition decision. Reaching out early protects your operation.
4. **Investigate the Source:** Request your supplier's records, examine the audit trail, and assess whether the residue could reflect environmental contamination rather than a prohibited application. Communicate your findings with your certifier.

An example of how a response protocol could play out in practice:

A tea processor running a routine quarterly screening detects a fungicide residue in a shipment from a supplier it has worked with for four years. The result is at 2.5 percent of the EPA tolerance, above the 0.01 ppm threshold but below the 5 percent line. The processor quarantines the lot and contacts the certifier the same day. After reviewing the supplier's field records and application logs, the certifier concurs that the residue is consistent with unintended environmental contamination from a neighboring conventional operation, not a prohibited application. The lot is ultimately sold as organic. The processor places the supplier on a higher-frequency testing tier for the next two seasons and documents the full sequence of events in its OSP records.

LEARN MORE

Read the article Ongoing Monitoring and Reporting Suspected Fraud to learn more about designing a response protocol tailored to your operation.

CONCLUSION

Residue testing gives you a verification measure that works at the product level rather than the paperwork level. But it is not a replacement for the documentation review, supplier verification, and audit trail management that form the foundation of your fraud prevention program. One clean test result does not guarantee a supply chain, and one positive result, handled correctly, does not end one.

Build testing into your monitoring program as one layer among several. Calibrate testing frequency to your actual risk picture, and let every result, whatever it shows, inform your ongoing supply chain review.

ACTION ITEMS

- Flag high-risk ingredients prone to fraud, genetic modification, or heavy pesticide history.
- Explicitly document testing methods, frequency, and results handling before your next inspection.
- Choose an accredited lab certified under ISO/IEC 17025 that covers your specific target analytes.
- Set a tiered testing schedule to screen high-risk suppliers frequently and reliable partners periodically.
- Draft a response protocol detailing step-by-step actions to quarantine lots if test results exceed the action threshold.

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