

ONE SAMPLE STRATEGY FOR AFLATOXIN RISK MANAGEMENT IN TEXAS

Texas Feed and Fertilizer Control Service



Office of the Texas State Chemist

Handbook

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**Office of the Texas State Chemist
Texas A&M University System**

One Sample Strategy

A Voluntary Aflatoxin Risk Management Program for the Texas Grain Industry

Office of the Texas State Chemist

Texas Feed and Fertilizer Control Service
445 Agronomy – College Station, TX 77843-2114

BACKGROUND

To manage the economic and food safety risk of aflatoxin contaminated corn, Texas producers, crop insurance agents, local grain elevators, feed mills, and regulators need real-time information about the true level of aflatoxin going into and out of corn bins. That's why timely, accurate, and reproducible aflatoxin results are the primary goal of the One Sample Strategy.

Accurate measurement of aflatoxin in corn is complicated by the nature of the toxin and the challenges of sampling and testing corn. To standardize these processes and reduce the variability of aflatoxin test results, the One Sample Strategy promotes the use of uniform sampling and testing equipment and methods. One Sample Strategy participants use equipment approved by the USDA Grain Inspection, Packers and Stockyards Administration (GIPSA) (**Appendix A**) to sample and grind corn and use GIPSA performance verified mycotoxin test kits that have been validated by the Office of the Texas State Chemist (OTSC) to measure aflatoxin at levels over 100 parts per billion (ppb) (**Appendix B**).

The OTSC Feed and Fertilizer Control Service (FFCS) provides regulatory oversight for the distribution and use of corn containing aflatoxin over 20 ppb in Texas and all FFCS field investigators carry state and U.S. Food and Drug Administration (FDA) credentials. As the competent authorities in Texas, OTSC and FFCS monitor all One Sample Strategy program activities. And through cooperation with the USDA Risk Management Agency (RMA) (**Appendix C**), One Sample Strategy aflatoxin results are recognized as official results for crop insurance purposes as well as regulatory compliance.

ELIGIBILITY & PARTICIPATION

All Texas grain and feed operators who are licensed to distribute corn over 20 parts per billion (ppb) aflatoxin are invited to participate. Firms agree to contribute:

- A written Sampling and Testing Plan (**Appendix D**);
- Industry recognized sample sizes, sample preparation methods and equipment;
- USDA/Association of Analytical Communities (AOACI)-approved testing methods;
- Recordkeeping and reporting; and
- Trained personnel.

OTSC does not charge for participation in the One Sample Strategy. Firms are responsible for all operating costs associated with the program but the cost of conducting the analysis and generating official results may be passed along to the seller.

EMPLOYEE PROFICIENCY

At least two employees must be assigned to perform One Sample Strategy activities at each location. These employees:

- Must review the One Sample Strategy handbook and approved Sampling & Testing Plan prior to the proficiency evaluation;
- Must be trained prior to the OTSC proficiency evaluation (**Appendix E**);
- May not wear clothing or headwear that represents any product or establishment other than OTSC while performing One Sample Strategy activities;
- Must meet the minimum age requirements established by the Texas Child Labor Law;
- May be required to pass a Texas criminal background check; and
- Are approved as OTSC designees authorized to issue official results.

At firms that issue official results for crop insurance, employees may not perform the aflatoxin analysis on a sample if the corn is owned by the employee or relatives of the employee. Family-owned operations may participate but cannot issue results for insurance.

PREVENTATIVE CONTROLS

Preventative controls serve as a mechanism for continual assessment and improvement. OTSC designees monitor preventative controls and take corrective actions to maintain equipment and analytical performance at five points within the process (Table 1).

Table 1. Preventative control points, objectives, and parameters.

POINT	OBJECTIVE	CONTROL PARAMETER
Sample collection	Ensure that the sample represents the entire truckload of corn	USDA Grain Inspection, Packers and Stockyards Administration (GIPSA) sampling patterns; and Grind a 5 lb. (minimum) sample from individual truckloads, or Grind a 15 lb. (minimum) composite sample
Grinder check (Appendix F)	Ensure that the sample is finely ground and homogeneous	≥70% of the ground particles (% fines) pass through a 20 mesh sieve
Lab scale calibration (Appendix G)	Ensure that the scale is calibrated	50 gram weight standard measures between 49.5 - 50.5 grams
Control sample analysis (Appendix H)	Maintain analytical performance to accurately measure aflatoxin concentrations	Control sample test results duplicate within acceptable range (e.g., ±34% [20 - 40 ppb] for a 30 ppb control)
File Sample Verification (Appendix I)	Retain a representative file sample for verification analysis by OTSC Agricultural Analytical Service (AAS)	Verification results duplicate within acceptable range <i>Note: Verification results are not used for regulatory purposes</i>

SAMPLING & TESTING

Uniform procedures reduce the variability of test results (**Appendices J – N**). One Sample Strategy procedures are based on the USDA Loss Adjustment Manual (LAM), the GIPSA Aflatoxin Handbook, Grain Inspection Handbook, and Equipment Handbook. Each participating location submits a customized Sampling and Testing Plan to describe how the standard operating procedures will be implemented.

Companies may choose to sample some or all truckloads incoming and/or outbound. Incoming trucks may be sampled individually or as a composite, however official results can only be issued for individual truckloads. The benefits of reduced regulatory surveillance vary depending upon sampling frequency (Table 2).

Table 2. Sampling frequency/regulatory surveillance scenarios

Scenario	Description
A	<u>If all corn is sampled inbound (individual truckloads or composite) and segregated by aflatoxin level; or all corn is sampled outbound</u> , the firm receives the full benefit of increased market confidence and reduced regulatory surveillance. OTSC will not sample or seize corn as it is distributed through the marketplace.
B	<u>If some but not all corn is sampled inbound and/or outbound</u> , OTSC may sample incoming truckloads and/or truckloads that have not been tested outbound.

Option to Divide Before Grinding: For individual truckloads, original samples larger than 10 lbs. may be reduced using a GIPSA approved divider (e.g., Boerner or cargo). Composite samples may be reduced to 15 lbs. (minimum).

Subsampling After Grinding: Proper subsampling techniques provide a representative sub-portion of a ground sample for testing. If the company's milling equipment does not subsample the ground material into two or three portions, the firm must subsample using GIPSA-approved equipment or an approved alternate method.

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RECORDKEEPING & REPORTING

All participating locations agree to keep records for a period of one year and make records available for OTSC review. Companies that issue official results also agree to share crop insurance sample information with RMA through OTSC. Records include:

- Scale tickets;
- Sample logs (**Appendix O**);
- Printed test results;
- File samples;
- Preventative control records (**Appendix P**);
- Certificate of analysis record (if official results are issued for crop insurance) (**Appendix Q**); and
- Corn exemption stamp (**Appendix R**).

MONITORING & CORRECTIVE ACTIONS

FFCS monitors personnel, equipment, and performance records to ensure compliance with the program standards (**Appendix S**). Unannounced monitoring visits occur weekly during harvest season at grain elevators. At feed mills, visits occur every 4-6 weeks throughout the year. During monitoring visits, an FFCS field investigator may:

- Observe sampling, grinding and testing procedures;
- Review records;
- Take corrective actions; and
- Collect file samples for verification analysis.

File samples collected by FFCS field investigators are analyzed (without further grinding) by the OTSC Agricultural Analytical Service (AAS) for:

- Aflatoxin using high performance liquid chromatography (HPLC); and
- Fumonisin using Ultra-high Performance Liquid Chromatography with a Tandem Mass Spectrometry Detector (LC/MS/MS).

OTSC compares the firm's aflatoxin result with the AAS result and reports the levels of aflatoxin and fumonisin to the company's management. Verification results are not used for regulatory purposes and no 'Report of Analysis' is issued. When aflatoxin verification results do not agree, OTSC performs a review to find the cause of the discrepancy and initiates corrective actions.

Corrective actions may include:

- Adjustment or repair of equipment;
- Retraining of personnel;
- Correction of records;
- Assistance from the firm's management to improve processes;
- Suspension or removal of an employee or firm from the program; and/or
- Criminal investigation if OTSC suspects that aflatoxin results have been intentionally misrepresented.

CONTACT INFORMATION

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Manager, Field Operations
Office of the Texas State Chemist
Phone: (979) 845-1121
Email: mary@otsc.tamu.edu

APPENDICIES

- A. Equipment Checklist**
- B. Aflatoxin Test Kit Comparison**
- C. USDA Risk Management Agency Bulletin**
- D. Sampling & Testing Plan**
- E. Employee Proficiency Checklist**
- F. Particle Size Check Procedure**
- G. Lab Scale Calibration Procedure**
- H. Control Sample Analysis Procedure**
- I. File Sample Procedure**
- J. Sampling Procedure (Individual Truckloads)**
- K. Composite Sampling Procedure**
- L. Grinding Procedure**
- M. Subsampling Procedure**
- N. Sample Analysis Procedure**
- O. Sample Analysis Log**
- P. Preventative Control Records**
- Q. Certificate of Analysis Record**
- R. Corn Exemption**
- S. Monitoring & Corrective Actions Checklist**

Early selection and procurement of equipment is essential for successful implementation of the One Sample Strategy. Refer to the [GIPSA Approved Equipment list](#) before purchasing and contact sales representatives early to ensure timely delivery. Example items are listed below. Equivalent items may be available from other suppliers.

Sampling & Grinding Equipment








- 6' spiral hand probe or hydraulic probe
 - [Part #39C-OH; 72" brass spiral probe with 12 openings](#)
 - [Part #72SBOH; 72" brass spiral probe with 11 openings](#)
- Sampling containers
- Grain test scale (to check the weight of original samples)
- Gram scale near the grinder (to weigh 100 g for particle size check)
- #20 wire-mesh sieve and pan
 - [Part # 20SS8F: 8" diameter grain sieve, 20 mesh wire sieve, stainless](#)
 - [Part # PS8F: matching bottom pan for the sieve](#)
- Optional:* Divider (to reduce sample before grinding)
 - [Part # 34: Boerner divider complete with 2 pans](#)
 - [Part # 292: Cargo type divider](#)
- Mill capable of producing $\geq 70\%$ fines
 - [Part # 9453: Grinder, 3-lb. Bunn with Part # 9517 Divider for Bunn Grinder](#)
 - [Part # EQMMS2010: Romer Series II Sub-Sampling Mill – 115V](#)
 - [Part # 70: Wonder Mill](#)
 - [Part # 43: Glen Mills Disk Mill](#)
- Optional:* Subsampling equipment or subdividing method (if mill is not equipped with diverter/sub-sampler)

Aflatoxin Analysis Equipment (see Appendix B Aflatoxin Test Kit Comparison)

- Rapid test kit reader
- Rapid test kit printer (or equivalent printing capabilities)
- Rapid test kits
- Accessories (e.g., multi-channel pipettes; air pumping station, glassware, incubator, etc.)
- Calibration set (if not included with the kit)
- Reagents (e.g., methanol or ethanol; and distilled or deionized water)
- Laboratory scale (with a minimum division of 0.1 grams)
- 50 gram weight standard (to calibrate the laboratory scale)
 - [Part # WT-50F: 50 gram stainless steel weight, class F](#)
- File sample bags

Equipment Providers

- [Hoffman Manufacturing, Inc.](#), (800) 692-5962
- [Mill & Elevator Supply Co., Inc.](#), (800) 821-5578
- Wheatland Equipment Co. ([Seedburo](#) distributor), (903) 577-0637
- [Romer Labs](#), (636) 583-8600, office@romerlabs.com
- [Charm Sciences, Inc.](#), (800) 343-2170, info@charm.com
- [Vicam](#), (877) 228-4244, orders@vicam.com
- [Neogen Corporation](#), (800) 234-5333, foodsafety@neogen.com
- [Grain Belt Supply](#), (800) 255-2742
- [GlenMills](#), (973) 777-0777

	ROSA® FAST Aflatoxin Quantitative (Charm Sciences, Inc.)	Veratox® (Neogen Corporation)	Reveal® Q+ (Neogen Corporation)	FluoroQuant® Afla (Romer Labs, Inc.)	AgraStrip® Afla Quantitative WATEX (Romer Labs, Inc.)	AflaTest® (VICAM)	Afla-V® (VICAM)
							
One Sample Strategy Range	5 – 150 ppb	5 – 100 ppb	5-100 ppb	5 – 1000 ppb	5-100 ppb	5 – 1000 ppb	5-100 ppb
Mechanism	Antigen/ Antibody color reading of strip	Antigen/ Antibody color reading of solution	Lateral flow	Fluorescence of analyte pushed through a column	Lateral flow immune- chromato- graphic assay	Fluorescence of analyte eluted through a column	Lateral flow
Extraction Solvent	100 mL 70/30 Methanol/ Water	250 mL 70/30 Methanol/ Water	250 mL 65/35 Ethanol/ Water	100 mL 80/20 Methanol/ Water	150 mL Water	100 mL 80/20 Methanol/ Water	250 mL 70/30 Methanol/ Water
# of samples/run	Up to 4	Up to ~ 40	1	1	1	1	1
Est. time/kit	3 min.	15 min.	12 min	10 min.	8 min.	7 min.	8 min.
Comments	Keep cold and bring to room temperature for testing	Keep cold and bring to room temperature for testing	Does not require refrigeration; Test kit developer and extractor react quickly	Does not require refrigeration; Test kit developer and extractor react quickly	Reagents must be at room temperature	Does not require refrigeration; Test kit developer and extractor react quickly	Refrigerate strip tests. Store at 39°- 46°F. Strip test and sample extract should be at room temperature before use.
Reader Part #	LF-ROSAREADER -M-NB; LF-ROSA-EZ-M	NEO9032	NEO9560	EQFFM3010	EQASR1010	G8000	725000574
Accessory Part #	Incubator LF-INC4-10- 45D	Starter Kit w/ multichannel pipette NEO9271A	Each kit comes complete with all test & accessory materials	Syringe plunger & stopper assembly COKFA1081	AgraStrip Incubator with timer EQASR1005	Single Position Pump Stand w/ hand pump 21020	Custom-V Incubator 600001330
Calibration Set Part #	Included w/ kit	Included w/ kit	Included w/ kit	COKFA2040	None required	33020	None required
Kit Part #	LF-AFQ-FAST	8030	8085	COKFA1010	COKAS1600W	AflaTest Columns	176002071

NOTE: To the best of our knowledge, the manufacturers listed above represent the rapid test kits most commonly used by grain elevator operators in Texas for the analysis of aflatoxin levels in corn. Kits were selected for validation based on a 2010 Aflatoxin Field Analysis study of Texas grain elevators and upon request by One Sample Strategy participants.



United States
Department of
Agriculture

Farm and Foreign
Agricultural
Services

Risk
Management
Agency

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Independence
Avenue, SW
Stop 0801
Washington, DC
20250-0801

BULLETIN NO.: MGR-12-004

APR 5 2012

TO: All Approved Insurance Providers
All Risk Management Agency Field Offices
All Other Interested Parties

FROM: William J. Murphy *William J. Murphy*
Administrator

SUBJECT: Continuation of One Sample Strategy for Aflatoxin Testing in Texas

BACKGROUND:

The Risk Management Agency (RMA) issued Manager's Bulletin MGR-11-011 on July 26, 2011, authorizing the "One Sample Strategy (OSS)" for aflatoxin testing in approved Texas elevator facilities for the 2011 crop year. The Bulletin stated RMA would annually reauthorize the program. RMA held discussions with the Office of the Texas State Chemist (OTSC), Regional Offices, and other interested parties, and received written summary results from OTSC to determine whether to continue the program beyond the 2011 crop year.

ACTION:

For the 2012 and succeeding crop years, Approved Insurance Providers (AIPs) may consider OTSC-approved Texas grain elevator facilities to be approved laboratories for corn Aflatoxin testing for crop insurance purposes, unless OTSC or RMA announces the suspension of OSS.

The OTSC will provide a list of participating elevator facilities that are certified to test for Aflatoxin on their website at the following address:

<http://otscweb.tamu.edu/Risk/OneSample/SampleAbout.aspx>

This list will be updated weekly. If an elevator is decertified by the OTSC, Aflatoxin tests conducted by that elevator after the date of decertification must not be used for Federal crop insurance purposes.

The OTSC will provide official test certificates of analysis documenting the level of Aflatoxin which will be completed by the participating elevator and provided to the insured. AIPs using these test results for claims settlement must maintain a copy of this official test certificate for the claim file.

AIPs may continue to use other approved private, State, or university laboratories for Aflatoxin testing in lieu of any elevators operating under the OTSC's OSS program.

DISPOSAL DATE:

December 31, 2012



The Risk Management Agency Administers
And Oversees All Programs Authorized Under
The Federal Crop Insurance Corporation

USDA is an Equal Opportunity Provider and Employer

Firm: _____

City/ Location:

New Participant

Renewing Participant

Contact Information

Main office phone:

Physical address *(for FedEx deliveries)*:

Primary contact:

Email:

Phone:

Secondary contact:

Email:

Phone:

Additional information (i.e., satellite storage facilities, etc.):

Participation *(include additional pages as necessary)*

1. Our firm rejects grain over _____ **ppb**

2. Does your firm segregate all grain by aflatoxin level? **YES** **NO**

3. Will your firm issue official results for crop insurance purposes? **YES** **NO**

4. Is every incoming truckload tested (individual loads or composite)? **YES** **NO**

5. Describe or illustrate your firm's probe pattern(s):

6. Describe or illustrate your firm's sub-sampling method:

7. If your firm will follow a composite sampling scheme, describe sampling frequency and composite sample labeling/identification method, etc.

Equipment & Methods

Describe the equipment your firm has allocated for the One Sample Strategy. Refer to GIPSA’s approved equipment list and the brand-specific equipment & supplies required for each test kit in the GIPSA Aflatoxin Handbook.

Item	In Place	On Order	N/A	Manufacturer/Model	Comments
6’ spiral hand probe or hydraulic probe					
Sampling containers					
Grain test scale <i>(to check weight of min. 5 lb. sample)</i>					
Gram scale near the grinder <i>(to weigh 100g for grinder check)</i>					
20 wire mesh sieve					
Boerner grain divider with 2 pans <i>(optional equipment used to reduce samples larger than 10-pounds)</i>					
Mill capable of producing ≥70% fines					
Subsampling equipment (aka riffler)					
Rapid test kit reader					
Rapid test kit printer					
Calibration set <i>(if not included with kit)</i>					
Rapid test kit accessories <i>(e.g., multi-channel pipette; air pumping station, etc.)</i>					
Methanol (or Ethanol)/Water <i>(if provided by commercial supplier)</i>					
Laboratory Scale <i>(minimum division of 0.1 grams)</i>					
50 gram weight standard					
File sample bags					

Submit completed plan to the Office of the Texas State Chemist (ATTN: Mary Sasser) by Email (mary@otsc.tamu.edu), fax (979) 845-1389, or US Post Office: P.O. Box 3160 College Station, TX 77841-2114.

Firm Name/Location		
Designee Name (print)		Date of Birth
Designee Signature		
By signing above, I confirm that I have received and read the One Sample Strategy Handbook, and agree to follow the program criteria and methods.		

Sampling:

Yes No

- 1. Employee follows the sampling pattern described in the approved sampling and testing plan.
- 2. Employee collects a representative corn sample (5 lb. minimum, individual truckload; 30 lb. minimum composite)
- 3. Employee cleans and dries sampling equipment and containers

Notes:

Investigator: _____

Date: _____

Approved: Yes No

Grinding:

Yes No

- 1. Employee correctly performs particle size check (_____%)
- 2. Employee cleans and dries mill, pans, dividers, and containers

Notes:

Investigator: _____

Date: _____

Approved: Yes No

Aflatoxin Testing:

Yes No

- 1. Employee correctly performs laboratory scale calibration
- 2. Employee collects and weighs a 50 g test sample
- 3. Employee correctly performs three* OTSC control sample analyses. Results must duplicate within acceptable limits (Table 1).

Investigator: _____

Date: _____

Approved: Yes No

Table 1.

OTSC control sample (ppb)	Duplication limit (%)	Acceptable Range Example
≤ 25	± 40	If the control is 20 ppb, the acceptable range is 12 - 28 ppb
> 25 to ≤ 50	± 34	If the control is 40 ppb, the acceptable range is 26 - 54 ppb
> 50 to ≤ 100	± 25	If the control is 80 ppb, the acceptable range is 60 - 100 ppb
> 100	± 20	If the control is 160 ppb, the acceptable range is 128 - 192 ppb

Test Kit: _____ Control Target: _____ (ppb) Range: _____ (ppb)

* No dilution is required for Romer FluoroQuant ([FGIS Policy #249](#)) or Vicam Aflatest ([FGIS Policy #257](#)). Employee performs two analyses without dilution.

Analysis #1: _____ (ppb) Analysis #2: _____ (ppb) Analysis #3: _____ (ppb)

Notes:

Purpose: Maintain mill performance

Objective:

Ensure that $\geq 70\%$ of the ground particles (% fines) pass through a 20 mesh sieve

Frequency:

Once daily and after repair or electrical outage

Equipment & Materials:

- Whole corn (~100 grams with $\leq 14\%$ moisture)
- Mill
- No. 20 wire woven mesh sieve
- Lab scale

Records:

- Particle Size Record

References:

- GIPSA Aflatoxin Handbook, Chapter 3, Section 3.7: Checking Particle Size
- Aflatoxin Handbook, Chapter 3, Section 3.6: Cleaning Grinders

Method:

1. Clean and dry grinding equipment
2. Grind corn in the mill
3. Weigh 100 grams of ground sample on the scale (record weight)
4. Place the 100 grams of ground sample in the top of the sieve
5. Cover the sieve with the lid (if available)
6. Shake the ground sample into the bottom pan
7. Weigh the portion that passed through the sieve (record weight)
8. Calculate the percent (%) fines:

$$\frac{\text{Portion passed through sieve (grams)}}{\text{Entire ground portion (grams)}} \times 100 = \% \text{ fines}$$

9. Complete the Particle Size Record
10. Take corrective action if the % fines are $< 70\%$
11. Properly dispose of the ground material
12. Clean and dry the grinding equipment

Corrective Actions:

- Adjust mill;
- Notify your supervisor to request equipment repair or replacement and post a repair note on the mill; and/or
- Grind samples as many times as necessary to achieve $\geq 70\%$ fines.

Purpose: Maintain scale (balance) performance

Objective:

Ensure that the scale is calibrated to weigh a 50 gram weight standard within ± 0.5 grams (49.5 - 50.5 grams)

Frequency:

Once daily and after repair or electrical outage

Equipment & Materials:

- 50 gram weight standard
- Filter paper or tongs
- Lab scale with minimum division of 0.1 gram

Records:

- Lab Scale Calibration Record

References:

- GIPSA Equipment Handbook, Chapter 2.4: Testing

Method:

Note: Keep the weight standard clean of particles or fingerprints.

Handle the weight with filter paper or forceps.

Store the weight in a clean and dry container.

1. 'Zero out' the balance with nothing on the scale
2. Pick up the 50 gram weight standard with filter paper or tongs
3. Place the 50 gram weight standard on the scale
4. Complete the Laboratory Calibration Record
5. Return the 50 gram weight standard to the storage box using the filter paper or tongs
6. Take corrective actions if the scale is not calibrated within an acceptable range (49.5 - 50.5 grams)

Corrective Actions:

- Clean the weight standard and scale before recalibrating
- Notify your supervisor to request equipment repair or replacement and post a repair note on the scale

Purpose: Maintain analytical performance to accurately measure the aflatoxin concentration of a sample.

Objective:

Ensure that aflatoxin control sample test results are within an acceptable range of duplication (Table 1)

Table 1. Duplication limits for aflatoxin control sample analysis.

Aflatoxin control sample test result (ppb)	Duplication limit (%)	Acceptable Range Examples
≤ 25	± 40	If the control is 20 ppb, the acceptable range is 12 - 28 ppb
> 25 to ≤ 50	± 34	If the control is 40 ppb, the acceptable range is 26 - 54 ppb
> 50 to ≤ 100	± 25	If the control is 80 ppb, the acceptable range is 60 - 100 ppb
> 100	± 20	If the control is 160 ppb, the acceptable range is 128 - 192 ppb

Frequency:

Firms that intend to issue certificates of analysis for crop insurance purposes: Run control twice daily, after changing to a new lot of test kits, or after an electrical outage.

Firms that do not issue certificates of analysis for crop insurance purposes: Run control twice on the first operating day of the week (AM and PM), after changing to a new lot of test kits, or after an electrical outage.

Note: Participating firms receive enough bottles of OTSC control sample to run the control analysis at least twice daily.

Equipment & Materials:

- Test kit reader, printer, and calibration set
- Rapid aflatoxin test kit and accessories
- Office of the Texas State Chemist aflatoxin control sample (50 grams)
- Calibrated lab scale with minimum division of 0.1 gram

Records:

- Control Sample Record

References:

- GIPSA Aflatoxin Handbook
- Manufacturer's product inserts

Method:

Note: Calibrate the test kit reader according to the manufacturer's instructions.

1. Weigh 50 grams of the control sample on the lab scale
2. Follow the aflatoxin analysis procedure for your test kit as described in the GIPSA Aflatoxin Handbook
3. Complete the Control Sample Record
4. Take corrective actions if the control sample result exceeds duplication limits (Table 1)

Corrective Actions:

- Check expiration dates on reagents and test kit; power off/on test kit reader and recalibrate; check pipettes, etc.
- Notify your supervisor to request assistance from OTSC

Purpose: Retain a representative file sample for verification analysis by OTSC Agricultural Analytical Service (AAS).

Objective:

Ensure that the file sample is properly labeled and stored.

Frequency:

Retain a file sample for each analysis.

Equipment & Materials:

- Retained corn sample (approximately 500-700 grams)
- File sample bag
- Spoon (to transfer the ground corn)
- Marker (to label the file sample bag)

Records:

- Scale ticket (to identify the sample)

References:

- GIPSA Aflatoxin Handbook, Chapter 3, Sample Preparation

Method:

1. Clearly label the file sample bag with the following information:
 - Date;
 - Producer's name;
 - Scale ticket number(s) (list all scale ticket numbers for composite samples); and
 - Aflatoxin level.
2. Place the retained portion in a file sample bag
3. Store file sample bag in a manner that will maintain the integrity of the sample
Note: Samples ≤ 20 parts per billion (ppb) should be stored separately from samples > 20 ppb.
4. Retain the file sample for a minimum of:
 - 15 days if the aflatoxin concentration is ≤ 20 parts per billion (ppb)
 - 6 weeks if the aflatoxin concentration is > 20 ppb.

Note: feed mills may be required to retain file samples for longer time periods.

Purpose: Maintain uniform sampling methods.

Objective:

Ensure that each sample is representative of the entire truckload of corn.

Frequency:

Refer to the approved Sampling and Testing Plan for your firm. Some or all truckloads may be sampled inbound and/or outbound. Truckloads may be sampled individually or as a composite.

Equipment & Materials:

- 6' spiral hand probe or hydraulic probe (to collect the sample)
- Sampling containers (to transport the sample)
- Grain test scale (to check the weight of the sample)

Records:

- Scale ticket (to record the date, producer information, sample weight, etc.)

References:

- USDA Risk Management Agency Loss Adjustment Manual, PAR. 102 F (2) (d) Representative Sampling Pattern Guidelines (Fig. 1)
- GIPSA Grain Inspection Handbook, Book 1, Chapter 2, Probe Sampling

Method:

2. Using clean and dry sampling equipment;
3. Collect a 5 pound (minimum) sample:
 - Select the appropriate sampling pattern;
 - If using a hand probe, angle the tip of the closed probe at 10° from vertical;
 - If using a hand probe, push the probe to the bottom of the trailer; If using a hydraulic probe, use caution to collect the sample from the lower portion of the truck;
 - Open the probe as you begin to pull the probe up;
 - Close the probe before pulling it out of the grain;
 - Empty the grain into a clean and dry sample container.
4. Large samples may be reduced to 5 pounds using an approved divider:
 - For individual truckload, samples >10 lbs. may be reduced;
 - For composite truckloads, samples >30 lbs. may be reduced.
5. Clean and dry sampling equipment;
6. Deliver the sample to the grinder with the Scale Ticket.

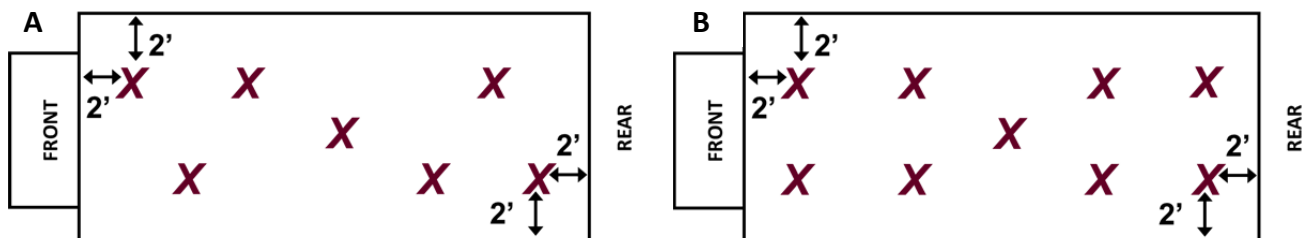


Figure 1. Representative Sampling Patterns. (A) PATTERN 1: With the tip of the probe angled 10 degrees, following the pattern below to insert the probe seven times when grain is loaded *more* than four feet deep in a flat-bottom truck or trailer. (B) PATTERN 2: With the tip of the probe angled 10 degrees, following the pattern below to insert the probe nine times when grain is loaded *less* than four feet deep in a flat-bottom truck, trailer, or when dealing with difficult sampling scenarios.

Purpose: Promote uniform sampling methods.

Objective:

Ensure that each sample is representative of the entire truckload of corn, and the combined sample represents the composite.

Frequency:

Refer to the approved Sampling and Testing Plan for your firm.

Equipment & Materials:

- 6' spiral hand probe or hydraulic probe (to collect the sample)
- Sampling containers (to transport the sample)
- Grain test scale (to check the weight of the sample)
- Boerner or cargo divider

Records:

- Scale tickets (to record the date, producer information, sample weight, etc.) for each individual truckload in the composite sequence.

References:

- GIPSA, Grain Inspection Handbook. Book 1. Chapter 1. Section 1.8 Proportional Sampling
- USDA Risk Management Agency Loss Adjustment Manual, PAR. 102 F (2) (d) Representative Sampling Pattern Guidelines
- GIPSA Grain Inspection Handbook, Book 1, Chapter 2, Probe Sampling

Method:

Follow the method described in the approved Sampling and Testing Plan for your firm.

Example Method:

1. Using clean and dry sampling equipment;
2. Sample and test the first truck from every field;
3. If the first truck from a field tests under 20 parts per billion (ppb); then:
 - a. The first truck is unloaded in the appropriate bin according to aflatoxin level;
 - b. Samples from the same field are collected (3 semi-trucks or 6 bobtail trucks);
 - c. Each individual sample (at least 10 lbs.) is reduced through a Boerner divider;
 - d. The entire composite sample (at least 15 lbs.) is ground;
 - e. A sub-portion of the ground sample is tested for aflatoxin.
4. If the first truck from a field tests over 20 ppb; then:
 - a. Each individual truckload is tested and segregated according to aflatoxin level.

Constraints:

- Scale tickets must be kept with the composite sample;
- Sample information for each truckload must be recorded in the sample log;
- All scale ticket numbers are included on the file sample bag;
- No certificates of analysis are issued for composite samples (Certificates may only be issued for individual loads).
- The composite sampling scheme may be adjusted at the end of working day if a field produces less than the minimum number of truckloads. For example: 2 semi-trucks, 20 lb. composite sample; 3 bobtails, 15 lb. composite sample.

Purpose: Promote uniform grinding methods.

Objective:

Ensure that each corn sample is ground to a sufficiently fine particle size to produce a homogeneous blend for aflatoxin testing.

Frequency:

Refer to the approved Sampling and Testing Plan for your firm.

Equipment & Materials:

- Representative corn sample (minimum 5 lbs. for individual truckloads; minimum 15 lbs. for composite samples)
- Mill (to grind the sample)
- One or more pans (to collect the ground sample)
- Cleaning method and/or equipment (to flush or vacuum the mill)

Records:

- Scale ticket (to identify the sample)

References:

- GIPSA Aflatoxin Handbook, Chapter 3, Sample Preparation

Method:

1. Clean and dry grinding equipment
2. Grind the entire sample
3. Collect a sub-portion for aflatoxin testing

Purpose: Collect a sub-portion of ground corn for aflatoxin testing and retain the remaining portion as a file sample (Fig. 1).

Objective:

Ensure that the subsample represents the aflatoxin concentration of the entire truckload.

Frequency:

Refer to the approved Sampling and Testing Plan for your firm.

Equipment & Materials:

- Ground corn sample
- Grain scale (to weigh the ground sample)
- Container (to transport the sample)
- Spatula or spoon
(to stir ground corn and collect portion for testing)
- Scale with a minimum division of 0.1 gram
(to weigh a 50 g portion for testing)

Records:

- Scale ticket (to identify the sample)

References:

- GIPSA Aflatoxin Handbook, Chapter 3, Sample Preparation

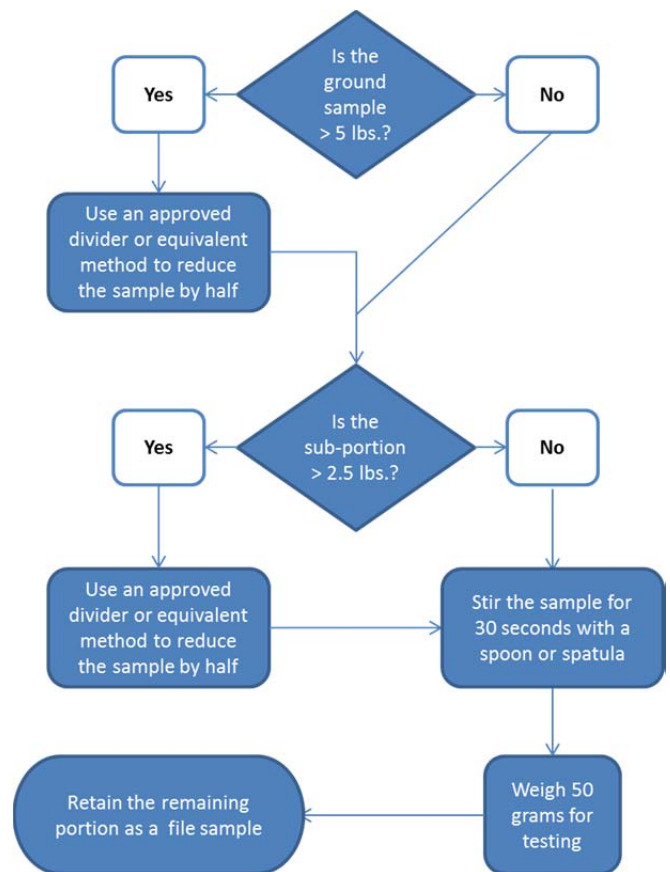


Figure1. Subsampling decision tree

Method:

1. Choose the appropriate method to subdivide:
 - A. *If the mill subdivides and the sub-portions are <2.5 lbs. (<1,135 grams):*
 - i. No further subdivision is necessary;
 - ii. Keep one portion for the aflatoxin test and file sample. Discard the unused portion(s).
 - B. *If the mill subdivides and the sub-portions are >2.5 lbs. (>1,135 grams):*
 - i. Use an approved divider or equivalent method to reduce one of the portions by half.
 - ii. Keep one portion for the aflatoxin test and file sample. Discard the unused portion(s).
 - C. *If the mill does not subdivide and the sample is >5 lbs. (>2,267 grams)*
 - i. Use an approved divider or equivalent method (as described in the Sampling & Testing plan) to reduce the sample by half; and
 - ii. Repeat the process to reduce the sub-portion by half again.
 - iii. Keep one portion for the aflatoxin test and file sample. Discard the unused portion(s).
2. Stir the subdivided sample portion for 30 seconds to produce a homogenous blend
3. Weigh 50 grams of the blended sample on the scale
4. Retain the remaining portion as a file sample

Purpose: Accurately measure the aflatoxin concentration of a sample.

Objective:

Ensure that the reported sample test results are timely, accurate, and reproducible.

Frequency:

Refer to the approved Sampling and Testing Plan for your firm.

Equipment & Materials:

- Test kit reader, printer, and calibration set
- Rapid aflatoxin test kit and accessories
- Office of the Texas State Chemist (OTSC) aflatoxin control sample (50 grams)
- Calibrated lab scale with minimum division of 0.1 gram

Records:

- Scale ticket (or tickets for composite sample analysis)
- Sample log

References:

- GIPSA Aflatoxin Handbook
- Manufacturer's product inserts

Method:

Note: Calibrate the test kit reader according to the manufacturer's instructions.

1. Weigh 50 grams of the sample on the lab scale
2. Follow the aflatoxin analysis procedure for your test kit as described in the GIPSA Aflatoxin Handbook

If the initial test results are above the range of the test kit, follow the GIPSA Aflatoxin Handbook instructions for supplemental analysis. *NOTE: Supplemental analysis is not required for Romer Fluoroquant® Afla ([GIPSA Memorandum #249, 8/2/12](#)) and Vicam AflaTest® ([GIPSA Memorandum #257, 7/30/2013](#))*

3. Enter sample information in the sample log; and
4. Complete the sample ticket.

Constraints:

- Under no circumstances may the truck be re-sampled and tested a second time by the same establishment or company (if there are multiple locations)
- At the request of the producer, a second 50 gram sample (obtained from the file sample) may be analyzed
- The average of the first and second analysis is reported as the official result
- Upon request, OTSC Agricultural Analytical Service (AAS) will analyze the retained file sample (without further grinding)

AFLATOXIN ANALYSIS SAMPLE LOG

Firm Name							Location		
Date Collected	Scale/Log Number	Farmer Name	Farm Number	Bushel Weight	Moisture	Analyst Initials	Run 1 Result	Run 2 Result	Final Result (Avg. Run 1&2)

APPENDIX P: Preventative Control Records

2014 Particle Size Record
 COMPANY
 City, Texas (#OTSC License)

Acceptable Range: 70 – 100% fines
Target: ≥70% fines

Date	Grinder's Initials	Result Before Adjustment	Result After Adjustment (or N/A); Description of Adjustment

2014 Lab Scale Calibration Record
 COMPANY
 City, Texas (#OTSC License)

Acceptable Range: 49.5 – 50.5 grams
Target: 50 grams (± 0.5)

Date	Analyst Initials	Calibration Result Before Adjustment	Calibration Result After Adjustment/ Description of Adjustment

2014 Control Sample Record
 Company
 City, Texas (#OTSC License)

Acceptable Range: 21 – 43 ppb
Sample ID: N2014-100
Target: 32 ppb (±34%)

Date	Time	Analyst	Initial Result	Result After Adjustment, Description of Adjustment, or N/A

Purpose: Share sample information submitted for crop insurance with Office of the Texas State Chemist (OTSC) and the USDA Risk Management Agency (RMA).

Objective: Ensure that aflatoxin results for crop insurance purposes are reported accurately and shared with OTSC.

Frequency: Send sample information to OTSC for each Certificate of Analysis issued for crop insurance purposes.

Equipment and Materials:

- Sample log
- Certificate of Analysis Record (Microsoft Excel macro)

Records:

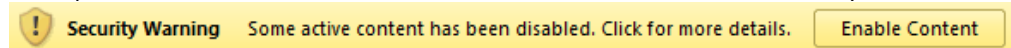
- Certificate of Analysis (Figure 1)

References:

- Certificate of Analysis Record instructions

Entering Sample Information:

1. Open Certificate Record.xls file and select 'Enable Content' on the security bar.



2. Select the 'Sample Data' button
3. Enter or copy/paste crop insurance sample information in columns A-J in the data worksheet:
 - A. DateCollected: date sampled
 - B. ScaleTicketNo: scale ticket or Log number
Note: Add 'R' (rejected) or 'ND' (no dump) in front of the scale ticket #when entering rejected load information
 - C. FarmNo: farm number
 - D. FarmName: farm name
 - E. SamplerID: enter 'OTSC Designee' (incoming) or 'Insurance Adjuster' (submitted)
 - F. DateAnalyzed: date tested
 - G. AnalystID: name of analyst (as it appears in the 'cAnalyst' worksheet)
 - H. Dfactor: dilution factor (blank = zero)
 - I. RunOneResult: result of first test (or first result after supplemental analysis)
 - J. RunTwoResult: second test result (with or without dilution) done at producer's request
4. Select 'Calculate' to see FinalResult (column K). FinalResult is automatically calculated as the average of RunOne and RunTwo; average is reported on the Certificate of Analysis.
5. Select File > Save As

Printing a Certificate of Analysis:

* A Certificate of Analysis cannot be printed for results ≤ 20 ppb aflatoxin

1. Select 'Certificate' button on the 'Main' worksheet
2. Click to select a scale ticket from the Certificates Management list
3. Select 'Print'
4. Select 'Print > choose print details (printer or PDF) > OK

Reporting Results to OTSC:

1. Save the Certificate Record file (.xls)
2. Email the Certificate Record.xls file as an attachment to mary@otsc.tamu.edu on a daily basis.



The Office of the Texas State Chemist (OTSC) administers the One Sample Strategy, a voluntary aflatoxin risk management program for Texas grain facilities that are licensed by Feed and Fertilizer Control Service (FFCS) to distribute corn over 20 parts per billion (ppb) aflatoxin. As part of the One Sample Strategy, OTSC verifies the proficiency of grain elevator employees to accurately measure aflatoxin in corn. Since aflatoxin measurements reported by OTSC designees are recognized as official OTSC results, corn distributed by One Sample Strategy facilities may be exempt from OTSC regulatory sampling and seizure.

The following information is intended to describe the criteria used by FFCS to determine if corn is exempt from regulatory sampling and aflatoxin testing; and describe the use and limitations of the OTSC One Sample Strategy stamp/sticker (Fig. 1) by participating firms.

Each One Sample Strategy facility receives a stamp (or equivalent stickers) from OTSC. The imprint of the stamp/sticker is placed on shipping documentation for outbound truckloads of corn and/or sewn-on deer corn tags. FFCS field investigators accept the imprint as evidence that the corn has been tested for aflatoxin according to the One Sample Strategy criteria and methods. OTSC will not collect a regulatory sample for aflatoxin testing when One Sample Strategy corn is encountered in the market.



Figure 1. Example OTSC One Sample Strategy stamps for: (left) firms that have tested all loads inbound and segregated by aflatoxin level; and (right) firms that test individual truckloads outbound.

Corn Exemption Eligibility Criteria

Corn is exempt from regulatory sampling, aflatoxin testing, and/or seizure when FFCS field staff determine, through review of records, that:

- a) A participating One Sample Strategy facility tests every incoming truckload of corn, segregates corn by aflatoxin level, and directs corn to the appropriate market channels; and/or
- b) The outbound documentation for an individual truckload of corn from a One Sample Strategy participant includes an imprint of the OTSC One Sample Strategy stamp or sticker; or
- c) Records indicate that all incoming corn purchased by an end user has been supplied by, or tested at, an eligible One Sample Strategy participant(s).

End users who purchase all corn from, or test all corn at, a One Sample Strategy location(s), should be aware that the benefit of the corn exemption (i.e., reduced regulatory surveillance) depends upon the availability of complete purchase records for FFCS review, and extends only so long as the One Sample Strategy supplier remains an eligible participant in the program.

Use of the OTSC One Sample Strategy stamp/sticker

One Sample Strategy firms may use the OTSC One Sample Strategy stamp/sticker to:

- a) Imprint outbound shipping documents; and/or
- b) Imprint sewn-on deer corn tags (not bags) or make copies of an imprinted tag; and/or
- c) Imprint sewn-on deer corn tags (not bags) with the following text:
'One Sample Strategy- Firm's OTSC license number' (e.g., One Sample Strategy-012345).

Limitations

One Sample Strategy participants must conform to OTSC Feed Industry Memorandum 5-12, all aspects of the Texas Commercial Feed Rules, and the One Sample Strategy criteria and methods. In addition:

- a) OTSC One Sample Strategy stamps/stickers remain property of OTSC and may be recalled by OTSC if the facility withdraws from the program or is suspended or removed; and
- b) Sewn-on deer corn tags with the OTSC-issued stamp imprint may not be distributed in the marketplace if the facility withdraws from the program or is suspended or removed.

Retained File Samples Collected			
Scale Ticket/Log #	Date Analyzed	Aflatoxin (ppb)	Analyst (or initials)

Refer to the firm's approved Sampling and Testing Plan to answer the following questions.

- | | | |
|--------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Yes | No | |
| <input type="checkbox"/> | <input type="checkbox"/> | Do designees correctly label file samples? <i>If no, describe your corrective actions.</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | Do designees use approved equipment and follow the sampling pattern described in the approved Sampling & Testing Plan to collect at least the minimum sample size? <i>If no, describe corrective actions.</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | Do designees perform the daily grinder check and enter the results in the particle size record?
<i>If yes, document the three most recent entries (date and result).</i>
<i>If no (or particle size is <70 % fines) describe your corrective actions.</i> |
| | | a) Date: _____ Result: _____% |
| | | b) Date: _____ Result: _____% |
| | | c) Date: _____ Result: _____% |
| <input type="checkbox"/> | <input type="checkbox"/> | Do designees perform the daily lab scale calibration check with a 50-gram weight standard and enter the results in the lab scale record? <i>If no, or results are <49.5g or >50.5g, describe your corrective actions.</i> |
| | | Current Control
Sample Level: _____ ppb |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the firm need more control sample? |
| <input type="checkbox"/> | <input type="checkbox"/> | Do designees perform the control sample analysis and document results on the Control Sample Record?
<i>If yes, submit the control sample record with your checklist. If no, describe your corrective actions.</i> |

Aflatoxin Analysis Summary (From date: _____ To Date: _____)

Total # of Samples Tested: _____	Maximum Level Tested: _____ ppb	Minimum Level Tested: _____ ppb
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