Product Instructions

Reveal Q+ for Fumonisin

The Toxin

Discovered in 1989, fumonisins are a family of mycotoxins produced by different species of the mold *Fusarium*. These molds commonly infect corn (in fact, they are considered ubiquitous in corn) and rice, hence the potential for fumonisins to be found in feed and foodstuffs is high. Fumonisins affect various animals differently and have been linked to esophageal cancer in humans. The Environmental Protection Agency classifies fumonisins as category II-B carcinogens.

Horses are extremely sensitive to low amounts of fumonisin, which can cause leukoencephalomalacia (liquefaction of the brain). In swine, research has shown fumonisin attacks the cardiopulmonary system causing pulmonary edema, as well as liver and pancreatic lesions.

Intended Use/User

Reveal® Q+ for Fumonisin is intended for the quantitative analysis of corn for fumonisin. The test kit is designed for use by quality control personnel and others familiar with commodities possibly contaminated by fumonisin.

User Responsibility

- Users are responsible for familiarizing themselves with product instructions and information. Visit our website at neogen.com, or contact your local Neogen® representative or authorized distributor for more information.
- When selecting a test method, it is important to recognize that external factors such as sampling methods, testing protocols, sample preparation, handling, laboratory technique and the sample itself may influence results.
- It is the user's responsibility in selecting any test method or product to evaluate a sufficient number of samples with the appropriate matrices and challenges to satisfy the user that the chosen test method meets the user's criteria.
- It is also the user's responsibility to determine that any test methods and results meet its customers' and suppliers' requirements.
- As with any test method, results obtained from use of any Neogen Food Safety product do not constitute a guarantee of the quality of the matrices or processes tested.

Assay Principles

Reveal Q+ for Fumonisin is a single-step lateral flow immunochromatographic assay based on a competitive immunoassay format. The extract is wicked through a reagent zone, which contains antibodies specific for fumonisin conjugated to colloidal gold particles. If fumonisin is present, it will be captured by the particle-antibody complex. The fumonisin-antibody-particle complex then is wicked onto a membrane, which contains a zone of fumonisin conjugated to a protein carrier. This zone captures any uncomplexed fumonisin antibody, allowing the particles to concentrate and form a visible line. As the level of fumonisin in a sample increases, free fumonisin will form a complex with the antibody-gold particles. This allows less antibody-gold to be captured in the test zone. Therefore, as the concentration of fumonisin in the sample increases, the test line density decreases. Algorithms programmed into the readers convert these line densities into a quantitative result displayed in parts per million (ppm). The membrane also contains a control zone where an immune complex present in the reagent zone is captured by an antibody, forming a visible line. The control line always will form regardless of the presence of fumonisin, ensuring the strip is functioning properly.

Storage Requirements

Store kit components at room temperature (18–30°C, 64–86°F) for full shelf life. Test strips should remain capped in their original tubes until used (for optimal performance).

Materials Provided

1. 25 Reveal Q+ for Fumonisin test strips
2. 25 red sample dilution cups
3. 25 clear sample cups
4. 1 bottles of sample diluent
5. Instructions for use

Materials Recommended But Not Provided

1. Sample collection cups with lids (700004011 | 9428, 700004012 | 9428B)
2. 65% ethanol solution (700002492 | 8073, 700002493 | 8074)
3. Agri-Grind grinder or equivalent (100001350 | 9401, 700004021 | 9453)
4. Microcentrifuge tubes (700003932 | 9172)
5. Mini centrifuge (700003963 | 9330)
6. Filter syringes (700002724 | 9420)
7. Sample collection tubes with caps (700002726 | 9421, 700002727 | 9421B)
8. Whatman #4 filter paper or equivalent (700004035 | 9519, 700006493 | 9429)
9. Pipettor, 200 µL (700004020 | 9488)
10. Pipettor, 100 µL (100001422 | 9860, 100001330 | 9272)
11. Pipette tips, 1-200 µL (100001352 | 9407, 100001353 | 9410, 700004099 | 9417)
12. Scale capable of weighing 5-50 g ±0.1 g (700004010 | 9427)
13. Timer (100001358 | 9426)
14. Reveal sample cup rack (700002734 | 9475)
15. Dispensing pump or graduated cylinder (700004020 | 9448, 100001367 | 9447)

Precautions

1. The test strips must remain inside the stay-dry tube before use.
2. Ethanol is highly flammable. Keep container tightly closed and away from heat, sparks, open flame and those who are smoking. It is toxic if swallowed, or if vapor is inhaled. Avoid contact with skin.
3. Store test kit at room temperature (18–30°C, 64–86°F) when not in use. Do not freeze.
4. Do not use kit components beyond expiration date.
5. Treat all used liquids, including sample extract, and labware as if contaminated with fumonisin. Gloves and other protective apparel should be worn at all times.
6. To avoid cross-contamination, use clean glassware for each sample, and thoroughly wash all glassware between samples.
7. Ensure the device lot number and the curve details match the lot ID number selected on the reader. Failure to update the lot-specific QR code within the AccuScan® Pro, AccuScan Gold, and Raptor® Solo reader will cause inaccurate results.

AccuScan Reader Set Up

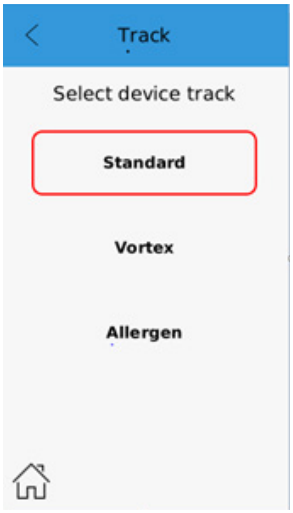
1. Enter the lot specific QR code by selecting **Scan QR** from the main screen. Place the lot specific QR code into the white cartridge adapter labeled Cal/QR and place the cartridge into the reader.
2. The valid code will be scanned by the reader and provide information on the lot number and expiry date. Verify this information is correct and then add the lot ID to the reader by pressing **Add Lot ID**.

Note: The lot ID for the current lot will now be stored with the test ID (e.g., fumonisin) and can be selected when running a test.

Raptor Solo Reader Set Up - Endpoint Procedure

The Solo reader must be in Standard mode to read the Reveal Q+ for Fumonisin test strips in Endpoint mode.

1. From the main menu, select the ⚙ in the upper left hand corner
2. Select track replacement
3. Return to the home screen by pressing the ⌂ in the lower left hand corner
4. Insert the track replacement tool with the arrow facing towards you into the track in the unit
5. Gently pull up to remove the track
6. Insert the standard Endpoint testing track into the unit (track with the blue dot on the right hand side)



Testing track removal tool

Testing Track — EndPoint

Sample Preparation

The sample to be tested should be collected according to accepted sampling techniques (see FGIS sampling protocol or contact your Neogen representative). Obtain a representative sample (minimum 100 g). Grind the sample so at least 95% of the ground material passes through a 20 mesh sieve (about the particle size of fine espresso).

Sample Extraction

1. If not using Neogen's prepared solution, prepare a 65% ethanol solution by mixing 6.5 parts ethanol with 3.5 parts distilled or deionized water for each sample.
2. Weigh out 10 g ± 0.1 of sample into an extraction cup.
3. Add 50 mL of 65% ethanol to the extraction cup.
4. Vigorously shake, using hand or mechanical means, for 3 minutes, or blend for 1 minute.
5. Allow the sample to settle, then filter with a filter syringe or Whatman #4 filter paper to collect a minimum of 3 mL filtrate into a sample collection tube. Or, you may also pipette 1 mL of sample into a 2.0 mL microcentrifuge tube, and centrifuge for 30 seconds using a microcentrifuge (approx. 2,000 x g).

Alternate – FGIS method

1. Combine 50 g of ground sample with 250 mL of 65% ethanol and shake vigorously for **3 minutes** or blend for **1 minute**. Allow sample to settle for 1–2 minutes.
2. Filter the extract by pouring 5 mL through a filter syringe and collecting the filtrate.

Validated/Verified Matrices

1:5 extraction: (1 part sample to 5 parts 65% ethanol), broken rice, canola meal, corn grits, cornmeal, corn, green lentils, oatmeal, soybean meal, wheat flour, wheat.

1:4 extraction: (1 part sample to 4 parts 65% ethanol), barley, corn gluten meal, DDGS, DDG wet cake, DDG syrup, hominy, milo, oats, rough rice, wheat bran, wheat midds. Please contact Neogen for additional extraction information.

1:3 extraction: (1 part sample to 3 parts 65% ethanol), brewers rice, corn protein concentrate, lentil fiber, navy beans, rice bran, rice hulls, sorghum, sunflower meal. Please contact Neogen for additional extraction information.

Note: Neogen continues to validate new commodities. Please contact a representative for the latest validated commodity list.

Test Procedure

AccuScan Gold, Raptor Solo Endpoint

1. Place the appropriate number of red sample dilution cups and clear sample cups into a sample cup rack. Label cups if necessary.
2. Add 100 µL of sample extract to a red dilution cup.
3. Add 200 µL of sample diluent to the red dilution cup with the sample. Mix by pipetting up and down 5 times.
4. Transfer 100 µL of diluted sample extract into a clear sample cup.
5. Place a new Reveal Q+ for Fumonisin test strip with the sample end down into the sample cup and set timer for **6 minutes**. Ensure the test strip comes into contact with liquid and begins to wick.
6. Remove the strip from the sample cup after it has developed for **6 minutes** and read immediately (within 30 seconds).
7. Results are displayed on the unit. Samples greater than 6 ppm must be diluted and re-tested.

Dilution Procedure

Samples greater than 6 ppm must be diluted and re-tested.

1. Add 200 µL of sample filtrate to a sample collection tube. Add 200 µL of 65% ethanol. Mix well by pipetting up and down 5 times.
2. Place the appropriate number of red sample dilution cups and clear sample cups into a sample cup rack. Label cups if necessary.
3. Add 100 µL of diluted sample filtrate (from step one) to a new red sample dilution cup.
4. Add 200 µL of sample diluent to the red dilution cup with the sample. Mix by pipetting up and down 5 times.
5. Transfer 100 µL of diluted sample extract (from step 4) into a clear sample cup.
6. Place a new Reveal Q+ for Fumonisin test strip with the sample end down into the sample cup and set timer for 6 minutes. Ensure the test **strip** comes into contact with liquid and begins to wick.
7. Remove the strip from the sample cup after it has developed for 6 minutes and read immediately (within 30 seconds).

Note: The reader will not calculate your dilution. FInal result displayed will need to be multiplied by 2.

Reading Test Results

Test strips should be read within **30 seconds** of completion of the **6 minute** incubation. Refer to **AccuScan Reader Set Up** for test selection and set up information.

1. Select the assay type (e.g., fumonisin) from the menu and ensure the device lot number matches the lot ID number selected on the reader. **Note:** Failure to update the lot-specific QR code will cause inaccurate results.
2. Fully insert the Reveal Q+ test strip into the R-labeled cartridge adapter with the sample end first and results facing out.
3. Insert the cartridge with test strip upside-down into the AccuScan Gold reader (the test lines will face downward into the reader) or test-strip side up for the AccuScan Pro. The reader will automatically begin analyzing the cartridge.
   Caution: Removing cartridge prior to completion can result in invalid readings.
4. The reader will analyze the test strip and results will be displayed and stored in the reader.

Notes

1. Ensure device is fully inserted into cartridge.
2. Readings should be made between **6–6.5 minutes**. Readings after 6.5 minutes may be inaccurate due to overdevelopment of the device.

Test Procedure

Raptor Integrated Analysis Platform

1. Place the appropriate number of red sample dilution cups into a sample cup rack. Label cups if necessary.
2. Add 200 µL of sample filtrate to each red sample dilution cup.
3. Add 400 µL of sample diluent to each red sample dilution cup. Mix by pipetting up and down five times.
4. Fully insert a Reveal Q+ for Fumonisin test strip into a Raptor cartridge.
5. Insert the Raptor cartridge containing the test strip into any of the three ports within the Raptor Integrated Analysis Platform reader.
   a. The bar code on the test strip will be read – the Raptor reader identifies the type of test strip and the lot number. If the lot number is not found in the system, the bar code reader on the front of the Raptor will turn on automatically.
   b. Scan the QR code found on the tube containing the test strips. The information will be stored on the system.
6. Enter a sample ID if desired. Hit the Accept button to go to the Add Sample screen.
7. Add 400 µL of sample from the red sample dilution cup (from step 3) to the Raptor cartridge.
   a. The Raptor reader will start automatically.
   b. Additional samples can be started in the other ports while the first sample is processing
8. Results will be displayed on the Raptor screen after the 6-minute testing is complete.

Dilution Procedure

Raptor Integrated Analysis Platform

Samples greater than 6 ppm must be diluted and re-tested.

1. Place the appropriate number of red sample dilution cups into a sample cup rack. Label cups if necessary.
2. Add 200 µL of sample filtrate to a sample collection tube.
3. Add 200 µL of 65% ethanol. Mix well by pipetting up and down 5 times.
4. Transfer 200 µL of diluted sample (from step 3) to a new red sample dilution cup.
5. Add 400 µL of sample diluent (pink-labeled bottle) to the red sample dilution cup. Mix by pipetting up and down five times.
6. Fully insert a Reveal Q+ for Fumonisin test strip into a Raptor cartridge.
7. Insert the Raptor cartridge containing the test strip into any of the three ports within the Raptor Integrated Analysis Platform reader.
   a. The bar code on the test strip will be read – the Raptor reader identifies the type of test strip and the lot number. If the lot number is not found in the system, the bar code reader on the front of the Raptor will turn on automatically.
   b. Scan the QR code found on the tube containing the test strips. The information will be stored on the system.
8. Enter a sample ID if desired. Hit the Accept button to go to the add sample screen.
9. Add 400 µL of sample extract from the red sample dilution cup (from step 5) to the Raptor cartridge.
10. The Raptor reader will start automatically
11. Additional samples can be started in the other ports while the first sample is processing
12. Results will be displayed on the Raptor screen after the 6-minute testing is complete. The final result will need to be multiplied by 2.

Performance Characteristics

Reveal Q+ for Fumonisin is designed for the quantitative analysis of fumonisin.

1. Range of detection: 0.3–6 ppm

Note: Samples greater than 6 ppm must be diluted and re-tested. Results below the range of detection should be reported as less than 0.3 ppm.

Customer Service

Neogen Customer Assistance and Technical Services can be reached by using the contact information on the back of this booklet. Training on this product, and all Neogen test kits, is available.

SDS Information Available

Safety data sheets (SDS) are available for this test kit, and all of Neogen's test kits, on Neogen's Web site at neogen.com, or by calling Neogen at 800.234.5333 or 517.372.9200.

Terms and conditions

Neogen's full terms and conditions are available online.

Warranty

Neogen Corporation makes no warranty of any kind, either expressed or implied, except that the materials from which its products are made are of standard quality. If any materials are defective, Neogen will provide a replacement of the product. Buyer assumes all risk and liability resulting from the use of this product. There is no warranty of merchantability of this product, or of the fitness of the product for any purpose. Neogen shall not be liable for any damages, including special or consequential damage, or expense arising directly or indirectly from the use of this product.

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