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User's Manual

Fumonisin ELISA

Enzyme immunoassay for the rapid quantitative determination of Fumonisin in cereals and beer /gyle

REF

DEFUME03



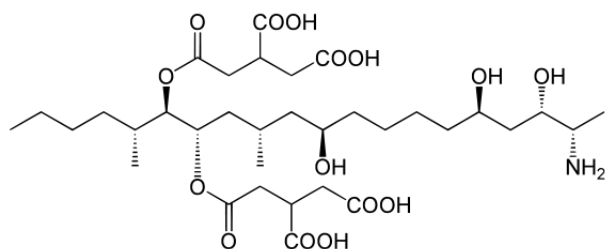
96 wells

RUO

For Research Use Only – Not for Use in Diagnostic Procedures

Sensitivity	0.04 – 0.16 ppm
Recovery (spiked samples)	97 – 107 %
Incubation Time	20 min

1. GENERAL INFORMATION



The **Fumonisin ELISA** represents a highly sensitive detection system and is particularly capable of the rapid quantification of fumonisin contaminations in cereals and beer.

This test is designed for detection of substances within food products. This is not a medical device and is not intended to diagnose or prevent any diseases or other conditions.

2. PRINCIPLE OF THE TEST

The **Fumonisin ELISA** quantitative test is based on the principle of the enzyme-linked immunosorbent assay. An antibody binding protein is coated on the surface of a microtiter plate. Fumonisin containing samples or standards, a fumonisin-peroxidase conjugate and an antibody directed against fumonisin are given into the wells of the microtiter plate. The conjugate competes with the fumonisin of samples/standards for the limited number of antibody sites. Simultaneously the anti-fumonisin antibody is bound to the antibody-binding protein coated on the microtiter plate. After 10 minutes incubation at room temperature the wells are washed with diluted washing solution to remove unbound material. A substrate solution is added and incubated for 10 minutes, resulting in the development of a blue colour. The colour development is inhibited by the addition of a stop solution, and the colour turns yellow. The yellow colour is measured photometrically at 450 nm. The concentration of fumonisin is indirectly proportional to the colour intensity of the test sample.

3. PRECAUTIONS

Full compliance of the following good laboratory practices (GLP) will determine the reliability of the results:

1. Prior to beginning the assay procedure, bring all reagents to room temperature (20-25°C).
2. All reagents should be mixed by gentle inversion or swirling prior to use. Do not induce foaming.
3. Once the assay has been started, all subsequent steps should be completed without interruption and within the recommended time limits.
4. Replace caps in all the reagents immediately after use. Do not interchange vial stoppers.
5. Use a separate disposable tip for each specimen to prevent cross-contamination.
6. All specimens and standards should be run at the same time, so that all conditions of testing are the same.
7. Do not mix components from different batches.
8. Do not use reagents after expiration date.
9. Check both precision and accuracy of the laboratory equipment used during the procedure (micropipettes, ELISA reader etc.).

4. HEALTH AND SAFETY INSTRUCTIONS

1. Do not smoke or eat or drink or pipet by mouth in the laboratory.
2. Avoid contact of substrate and stop solution with skin and mucosa (possible irritation, burn or toxicity hazard). In case of contact, rinse the affected zone with plenty of water.
3. Handling and disposal of chemical products must be done according to good laboratory practices (GLP).

5. REAGENTS

The kit contains reagents for 96 determinations. They have to be stored at 2-8°C. Expiry data are found on the labels of the bottles and the outer package.

1. **SORB** **MT** Microtiter plate consisting of 12 strips with 8 breakable wells each, coated with anti-body-binding protein.
2. **CAL** **1** – **6** Fumonisin (B1) Standards (0; 0.05; 0.15; 0.5; 1.5; 5 ppm): 6 vials with 1 mL each, dyed red, ready-to-use. Because of the total dilution of 1:75 of the cereal samples in the extraction step, the calibrators contain 1/75th of the stated value. Thus no further calculation after analysis is necessary.
3. **Ab** Anti-Fumonisin Antibody (rabbit): 6 mL, dyed blue, ready-to-use.
4. **ENZ** **CONJ** Conjugate (Fumonisin-Peroxidase): 6 mL, dyed red, ready-to-use.
5. **SUB** **TMB** Substrate Solution (TMB): 15 mL, ready-to-use.
6. **STOP** **SOLN** Stop Solution (1 N acidic solution): 15 mL, ready-to-use.
7. **SAM** **DIL** Sample Diluent (PBS): 2 x 60 mL, dyed red, ready-to-use.
8. **WASH** **SOLN** **10x** Washing Solution (PBS + Tween 20): 60 mL as 10x concentrate. Dilute 1+9 with distilled water. If during the cold storage crystals precipitate, the concentrate should be warmed up to 37°C for 15 minutes.
9. Instruction Manual.

6. ADDITIONAL INSTRUMENTATION AND REAGENTS (NOT PROVIDED)

Instrumentation

- 50 and 100 µL- micropipettes
- ELISA reader (450 nm)
- Centrifuge
- Ultra-Turrax, mixer, vortex
- Resealable plastic bag for storing unused strips

Reagents

- Double distilled water
- Methanol

7. SAMPLE PREPARATION

Cereals

- Grind sample to pass through a 20 mesh sieve and thoroughly mix prior to sub-sampling.
- Suspend 20 g of sample in 100 mL of 70 % methanol.
- Mix suspension for 5 minutes.
- Filter through Whatman #1 filter or alternatively centrifuge at a minimum of 3000 g for 5 minutes.
- Dilute 50 µL of filtrate/supernatant with 700 µL of sample diluent and test the sample in the ELISA.

Beer / Gyle

- Dilute an adequate volume of sample diluent with 5 % methanol.
- Carbonized beer samples should be preliminarily degassed by moderate heating.
- Cloudy beers (such as beer brewed from wheat) / gyle should preliminarily be sterile-filtered.
- Dilute 100 µL beer / gyle with 900 µL sample diluents/methanol dilution.

In case of too high concentrated samples, an adequate volume of sample diluent is diluted with 5 % methanol. The sample extracts have to be further diluted with this dilution.

8. PROCEDURE

1. Prepare samples as described above.
2. Pipet 100 µL standards or prepared samples in duplicate into the appropriate wells of the micro-titer plate.
3. Add 50 µL of fumonisin-peroxidase conjugate into each well.
4. Add 50 µL of the anti-fumonisin antibody into each well.
5. Incubate for 10 minutes at room temperature.
6. Wash the plate three times as follows: Discard the contents of the wells (dump or aspirate). Pipet 300 µL of diluted washing solution into each well. After the third repetition empty the wells again and remove residual liquid by striking the plate against a paper towel. The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbencies.
7. Pipet 100 µL of substrate solution into each well.
8. Allow the reaction to develop in the dark (e.g. cupboard or drawer; the chromogen is light-sensitive) for 10 minutes at room temperature.
9. Stop enzyme reaction by adding 100 µL of stop solution (1 N acidic solution) into each well. The blue colour will turn yellow upon addition.
10. After thorough mixing, measure absorbance at 450 nm (reference wavelength 620 nm), using an ELISA reader. The colour is stable for 30 minutes.

9. CALCULATION OF RESULTS

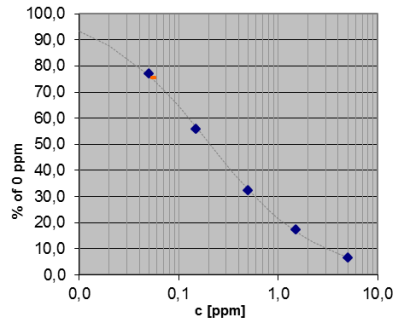
The ready-to-use standards are prepared for a direct determination of cereal sample concentrations. The dilution of samples in the extraction process as described in the above stated sample preparation procedure is already considered. Additional dilution due to high sample concentration has to be accounted for.

1. Calculate the average optical density (OD 450 nm) for each set of reference standards or samples.
2. Construct a standard curve by plotting the mean optical density obtained for each reference standard against its concentration in ppm on semi-log graph paper with the optical density on the vertical (y) axis and the concentration on the horizontal (x) axis. Alternatively the evaluation can be carried out by software. In this case the 4-parameter method should be preferred.
3. Using the mean optical density (OD) value for each sample, determine the corresponding concentration of fumonisin in ppm from the standard curve. Depending on experience and/or the availability of computer capability, other methods of data reduction may be employed.
4. Due to a deviating sample preparation process the results for Beer / Gyle samples additionally have to be multiplied with 0.133 in order to get the real concentration of the sample.

10. TYPICAL STANDARD VALUES

The following table contains an example for a typical standard curve. The binding is calculated as percent of the absorption of the 0 ppm standard. These values are only an example and should not be used instead of the standard curve which has to be measured in each new test.

Fumonisin (ppm)	% binding of 0 ppm
0	100
0.05	77
0.15	56
0.5	32
1.5	17
5	7



11. PERFORMANCE

Sensitivity

The limit of detection (LOD) of the **Fumonisin ELISA test** is 0.015 ppm.

Validation experiments with common matrices resulted in the following LODs [ppm].

Wheat	0.010
Rye	0.025
Barley	0.011
Oats	0.015
Corn	0.014
Rice	0.025
Beer	0.004

The limit of quantification (LOQ) of the **Fumonisin ELISA test** is 0.05 ppm.

Due to the variety of sample matrices and their influence on the blank, results less than the LOQ should be treated as negative.

Recovery

Wheat flour	92 %
Oats flour	89 %
Rice flour	94 %
Corn flour	105 %
Beer	105 %

Linearity

The serial dilution of spiked samples (wheat, oats, rice, corn and beer) resulted in a dilution linearity of 86-100 %.

Precision

Intra-assay Precision	3-4 %
Inter-assay Precision	6-8 %



Cross-reactivity

Cross-reactivity	relative to fumonisin B1 (= 100 %)
Fumonisin B2	62 %

12. REFERENCES

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Symbol	English	Deutsch	Français	Espanol	Italiano
	European Conformity	CE-Konformitäts-kennzeichnung	Conforme aux normes européennes	Conformidad europea	Conformità europea
	Consult instructions for use	Gebrauchsanweisung beachten	Consulter les instructions d'utilisation	Consulte las Instrucciones	Consultare le istruzioni per l'uso
	In vitro diagnostic device	In-vitro-Diagnostikum	Ussage Diagnostic in vitro	Diagnóstico in vitro	Per uso Diagnostica in vitro
	For research use only	Nur für Forschungszwecke	Seulement dans le cadre de recherches	Sólo para uso en investigación	Solo a scopo di ricerca
	Catalogue number	Katalog-Nr.	Référence	Número de catálogo	No. di Cat.
	Lot. No. / Batch code	Chargen-Nr.	No. de lot	Número de lote	Lotto no
	Contains sufficient for <n> tests/	Ausreichend für "n" Ansätze	Contenu suffisant pour "n" tests	Contenido suficiente para <n> ensayos	Contenuto sufficiente per "n" saggi
	Note warnings and precautions	Warnhinweise und Vorsichtsmaßnahmen beachten	Avertissements et mesures de précaution font attention	Tiene en cuenta advertencias y precauciones	Annoti avvisi e le precauzioni
	Storage Temperature	Lagerungstemperatur	Temperature de conservation	Temperatura de conservacion	Temperatura di conservazione
	Expiration Date	Mindesthaltbarkeitsdatum	Date limite d'utilisation	Fecha de caducidad	Data di scadenza
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