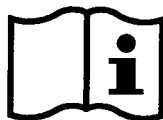


Product information

Information about other products is available at: www.demeditec.com



User's Manual

Mustard ELISA

Enzyme Immunoassay for the quantitative determination of mustard in food

REF

DEMUSE01



96 wells

For

RUO

Research Use Only – Not for Use in Diagnostic Procedures

Sensitivity (Mustard)	1 ppm
Recovery	76-98 %
Incubation Time	60 min

1. GENERAL INFORMATION

The **Mustard ELISA** represents a highly sensitive detection system for yellow mustard and is particularly capable of the quantification of residues in sausage, dressings, soups, cheese and mixed herbs. Due to high cross-reactivity the test is also suitable for the detection of brown mustard and black mustard.

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 **Mustard** quantitative test is based on the principle of the enzyme linked immunosorbent assay. An antibody directed against mustard proteins is bound on the surface of a microtiter plate. Mustard containing samples or standards are given into the wells of the microtiter plate. After 20 minutes incubation at room temperature, the wells are washed with diluted washing solution to remove unbound material. A peroxidase conjugated second antibody directed against mustard proteins is given into the wells and after 20 minutes of incubation the plate is washed again. A substrate solution is added and incubated for 20 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 mustard is directly 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 (micro-pipets, ELISA reader etc.).

4. HEALTH AND SAFETY INSTRUCTIONS

1. Do not smoke or eat or drink or pipet by mouth in the laboratory.
2. Wear disposable gloves whenever handling patient specimens.
3. 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.
4. 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 printed 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-mustard antibodies.
2. **CAL** **1** – **5** Mustard Standards (0; 2; 6; 20; 60 ppm of mustard): 5 vials with 2.0 mL each, dyed red, ready-to-use.
3. **ENZ** **CONJ** Conjugate (anti-mustard-peroxidase): 15 mL, dyed red, ready-to-use.
4. **SUB** **TMB** Substrate Solution (TMB): 15 mL, ready-to-use.
5. **STOP** **SOLN** Stop Solution (0.5 M H₂SO₄): 15 mL, ready-to-use.
6. **SAM** **DIL** **10x** Extraction and sample dilution buffer (Tris): 2 x 120 mL as 10x concentrate, dyed red. Dilute 1+9 with distilled water. Stored at 4°C the diluted buffer is stable for at least one week. If during the cold storage crystals precipitate, the concentrate should be warmed up to 37°C for 15 minutes.
7. **WASH** **SOLN** **10x** Washing Solution (PBS + Tween 20): 60 mL as 10x concentrate. Dilute 1+9 with distilled water. Stored at 4°C the diluted buffer is stable for at least 4 weeks. If during the cold storage crystals precipitate, the concentrate should be warmed up to 37°C for 15 minutes.
8. Instruction Manual.

6. ADDITIONAL INSTRUMENTATION AND REAGENTS (NOT PROVIDED)

Instrumentation

- 100 - 1000 µL micropipets
- Volumetric flask
- Analytical balance
- Mortar, mixer
- Water bath
- Centrifuge
- ELISA reader (450 nm)
- Plastic bag to store unused microtiter strips.

Reagents

- double distilled water

7. SAMPLE PREPARATION

Due to high risk of cross-contamination all applied instruments like applicator, mortar, glass vials etc. have to be **cleaned thoroughly** before and after each sample. Mustard proteins could adhere to different surfaces. To identify possible cross-contamination caused by previous extractions it is strongly recommended to note the sequence of the extractions.

The following sample preparation should be applied for all kinds of samples:

1. To maximize homogeneity and representativeness of the sample drawing, a minimum of 5 g sample should be pulverized finely in a mortar, impact mill, etc.
2. 1 g of the homogenized mixture is suspended in 20 mL of **pre-diluted** extraction buffer. Afterwards the suspension is incubated for 15 min in a preheated water bath at 60°C. To ensure good homogeneity, the samples should be shaken every two minutes.
3. The samples are centrifuged for 10 minutes at 2500 g. If it is not possible to separate the supernatant from the precipitate completely, the suspension should be filtrated.
4. 100 µL of particle-free solution are applied per well. If the results of a sample are out of the measuring range, further dilution with the **pre-diluted** extraction and sample dilution buffer is necessary. The additional dilution has to be considered when calculating the concentration.

8. PROCEDURE

The washing solution is supplied as 10x concentrate and has to be **diluted** 1+9 with double distilled water before use.

In any case the **ready-to-use** standards provided should be determined twofold. When samples in great quantities are determined, the standards should be pipetted once before the samples and once after the samples. For final interpretation the arithmetic mean is used for calculation.

In consideration of GLP and quality control requirements a duplicate measurement of samples is recommended.

The procedure is according to the following scheme:

1. Prepare samples as described above.
2. Pipet 100 µL **ready-to-use** standards or prepared samples in duplicate into the appropriate wells of the microtiter plate.
3. Incubate for 20 minutes at room temperature.
4. 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.
5. Pipet 100 µL of conjugate (anti-mustard-peroxidase) into each well.
6. Incubate for 20 minutes at room temperature.
7. Wash the plate as outlined in 4.
8. Pipet 100 µL of substrate solution into each well.
9. Allow the reaction to develop in the dark (e.g. cupboard or drawer; the chromogen is light-sensitive) for 20 minutes at room temperature.
10. Stop enzyme reaction by adding 100 µL of stop solution (0.5 M H₂SO₄) into each well. The blue colour will turn yellow upon addition.
11. 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 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 value for each sample, determine the corresponding concentration of mustard in ppm from the standard curve. Depending on experience and/or the availability of computer capability, other methods of data reduction may be employed.

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 60 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.

Mustard (ppm)	% binding of 60 ppm
60	100
20	68
6	38
2	13
0	4

11. PERFORMANCE

Sensitivity

The limit of detection (LOD) of the **Demeditec Mustard test** is 1 ppm. The limit of quantification (LOQ) of the **Demeditec Mustard test** is 2 ppm. Due to the variety of sample matrices and their influence on the blank, results less than the LOQ should be treated as negative.

Cross-reactivity

For the following foods no cross-reactivity could be detected:

Adzuki	Chestnut	Fenugreek	Oats	Rice
Almond	Chia	Garden cress	Onion	Rye
Apricot	Chicken	Garlic	Paprika	Saccharose
Barley	Chickpea	Gliadin	Pea	Sesame
Bean, white	Chili	Goat's milk	Peach	Shrimps
Beef	Cinnamon	Guar gum	Peanut	Soy flour
Bovine gelatin	Clove	Hazelnut	Pecan	Soy lecithin
Brazil nut	Cocoa	Horseradish	Pepper	Split peas
Buckwheat	Coconut	Kidney bean	Pine seed	Sunflower seeds
Caraway	Cod	Kiwi	Pistachio	Thyme
Cardamon	Corn	Lamb	Poppy seed	Tomato
Carob gum	Cow's milk	Leek	Pork	Turkey
Carrot	Cumin	Lentil	Potato	Walnut
Cashew	Curcuma	Linseed	Prawn, cooked	Wheat
Cayenne	Dill	Lupin	Prawn, raw	White cabbage
Celery	Duck	Macadamia	Pumpkin seed	
Cherry	Fennel	Nutmeg	Radish	

The following cross reactions were determined:

Black mustard	50%
Brown mustard	59%
Charlock mustard	48%
Rapeseed	59%

Precision

Intra-assay Precision	8 %
Inter-assay Precision	12 %

Linearity

The serial dilution of spiked samples (sausage, salad dressing, instant soup, canned soup, cheese, mixed herbs) resulted in a dilution linearity of 81% - 117%.

Recovery



Mean recovery was determined by spiking samples with different amounts of mustard:

Sausage	98 %
Salad dressing	76 %
Instant soup	80 %
Canned soup	96 %
Cheese	89 %
Mixed herbs	78 %

12. REFERENCES

1. Lee PW, et al. (2008) – Sandwich enzyme-linked immunosorbent assay (ELISA) for detection of mustard in food. J Food Sci, 73(4):62-68
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3. Shim YY, et al. (2008) - Quantitative detection of allergenic protein Sin a 1 from yellow mustard (sinapsis alba L.) seeds using enzyme-linked immunosorbent assay. J Agric Food Chem, 56(4):1184-92
4. Lee PW, et al. (2009) – Detection of mustard, egg, milk and gluten in salad dressing using enzyme-linked immunosorbent assays (ELISAs). J Food Sci, 74(5):46-50
5. Palomares, et al. (2005) – Isolation and identification of an 11S globulin as a new major allergen in mustard seeds. Ann Allergy Asthma Immunol, 94(5):586-92

SYMBOLS USED WITH DEMEDITEC ASSAYS

Symbol	English	Deutsch	Français	Espanol	Italiano
	European Conformity	CE-Konfirmitäts-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	Usage 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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