

# EASI-EXTRACT<sup>®</sup> CITRININ

Product Code: DP126 / P126

Immunoaffinity columns for use in conjunction with HPLC or LC-MS/MS.  
For in vitro use only.

P126/V8/29.10.21

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**R·BIOPHARM**  
**RHÔNE LTD**



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## Test Principle

The procedure is based on monoclonal antibody technology, which makes the test highly specific, sensitive, rapid and simple to perform.

The columns contain a gel suspension of monoclonal antibody specific to the toxin of interest. Following extraction of the toxin the sample extract is filtered, diluted and passed slowly through the immunoaffinity column. Any toxin which is present in the sample is retained by the antibody within the gel suspension. The column is washed to remove unbound material and the toxin is then released from the column following elution with solvent. The eluate is collected prior to analysis by HPLC or LC-MS/MS.

The total extraction and clean-up time takes approximately 20 minutes to perform. The result is improved clean-up and concentration of the toxins from food and feed samples giving a much cleaner chromatogram and therefore providing more accurate and sensitive detection. The columns also have the added advantage that they can be automated for large scale analysis of samples.

## Reagents Not Provided

- Distilled / Deionised Water (suitable for use with HPLC, e.g. MilliQ)
- Solvents (HPLC Grade Methanol and Acetonitrile)
- Phosphate Buffered Saline (PBS) (RP202)\*
- Citrinin Standard (Please refer to Preparation of Standards section)
- Phosphoric Acid
- Tween 20
- Sodium Hydroxide

## Accessory Products

- Whatman No. 113 or No. 4 Filter Paper
- Glass Microfiber Filter Paper
- Immunoaffinity Column Rack (CR1)\*
- Immunoaffinity Column Accessory Pack (AP01)\*

\* Available from R-Biopharm. Please contact your local R-Biopharm distributor for further information.

## Hazards

Mycotoxins are very hazardous substances. Only laboratories equipped to handle toxic materials and solvents should perform analyses. Suitable protective clothing, including gloves, safety glasses and lab coats should be worn throughout the analysis.

Flammable solvents should be stored in an explosion-proof cabinet. Use a chemical hood and protective equipment as applicable.

Contact your local R-Biopharm distributor for a Material Safety Data Sheet for further information if required.

## Recommended Methods and Application Notes

Methods are available for all matrices covered by legislation as well as additional commodities. Deviation from the methods described in our Instructions For Use and Application Notes may not achieve optimum results. Please contact your local R-Biopharm distributor for further information.

## Decontamination

Prior to disposal, excess standard solutions should be treated with at least one-tenth their volume of 5 % sodium hypochlorite. Labware and contaminated waste should be immersed in 5 % sodium hypochlorite solution for 30 minutes followed by the addition of 5 % acetone for 30 minutes. Flush with copious amounts of water before disposal. After decontamination labware should be thoroughly washed. Incinerate waste if regulations permit.

## Storage & Shelf Life

The columns expire 18 months from date of manufacture if stored at 2 - 8 °C or 12 months from date of manufacture if stored at 21 - 25 °C. Do not freeze.

Ensure the column has not dried out and contains buffer above the gel. It is important to note the antibody included in the immunoaffinity column can be denatured by extreme temperature or pH change.

## Sampling

A representative sample should be obtained by following one of the officially recognised sampling procedures. It is recommended that a minimum of 1 kg of representative sample is finely ground and a portion (5 - 50 g dependent on method used) of this is removed and extracted.

## Sensitivity

The sensitivity is dependent on the final detection system employed by the analyst. However the test sensitivity may be improved if required by increasing the volume of sample passed through the immunoaffinity column. Please note the ratio of solvent to phosphate buffered saline (PBS) should be maintained.

## Recoveries

If an analyst wishes to account for losses during extraction it is recommended a spiked sample of the same commodity type as the material being tested is analysed following the complete procedure as a reference standard. The recoveries obtained with the spiked sample can be used to correct the results obtained with the test sample.

## Column Preparation

Immunoaffinity columns should be at ambient temperature before use. Remove the cap from the top of the column and discard. Firmly attach the column to a glass syringe barrel using an adapter and place in an immunoaffinity column rack or clamp stand.

## Elution

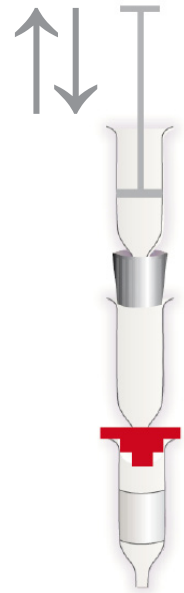
In order to fully elute the toxin/s from the immunoaffinity column it is vital that the solvent is in contact with the antibody within the gel suspension for a sufficient period of time. This ensures that all of the bonds between the antibody and the toxin are broken, ultimately releasing all of the toxin from the column for analysis with the detection system of choice

To ensure that the solvent is in contact with the antibody gel for a sufficient period of time any of the following elution methods can be used: -

**Backflushing (this is the preferred method of choice at R-Biopharm):** backflush by gently raising and lowering the syringe plunger during passage of the solvent through the column. This process will reverse the direction of flow of the eluate through the gel. This should be repeated 3 times before collecting the eluate. Proceed to the next step in the method.

**Application of small volumes of solvent:** apply the volume of solvent required for elution in two or three smaller aliquots. Allow each aliquot to remain in contact with the gel suspension for a minimum of 30 seconds before allowing each to pass fully through the gel suspension for collection. Proceed to the next step in the method.

**Incubation with solvent:** apply the full volume of solvent required for elution and allow 2-3 drops of the solvent to pass through the column for collection. Allow the remainder of the solvent to remain in contact with the gel suspension for a minimum of 60 seconds before allowing it to pass through the gel suspension for collection. Proceed to the next step in the method.



### **Preparation of 10 mM Phosphoric Acid (pH 2.5)**

The buffer can be kept for 5 days if stored at room temperature.

1. Measure 1.368 ml of phosphoric acid into a flask.
2. Make up to 2 L with water.
3. Adjust to around pH 2.5 with 2 M sodium hydroxide.

### **Preparation of 10 mM Phosphoric Acid (pH 7.4)**

The buffer can be kept for 5 days if stored at room temperature.

1. Measure 500 ml of phosphoric acid (pH 2.5) into a flask.
2. Adjust to around pH 7.4 with 2 M sodium hydroxide.

### **Preparation of 0.1 % Tween 20 in 10 mM Phosphoric Acid (pH 7.4)**

The buffer can be kept for 5 days if stored at room temperature.

1. Measure 0.5 ml of Tween 20 into a flask.
2. Make up to 500 ml with 10 mM phosphoric acid (pH 7.4).

## Sample Preparation

### • Cereal

This method has been tested on a number of cereals including barley, maize, oats, rice, rye and wheat.

1. Weigh 20 g of ground sample into a 1 litre capacity, solvent resistant blender jar.
2. Add 100 ml of 75 % methanol and blend at high speed for 2 minutes.
3. Filter the sample through Whatman No. 113 or No. 4 filter paper, or centrifuge at 4,000 rpm for 10 minutes.
4. Dilute 2 ml of filtrate with 18 ml of phosphate buffered saline (PBS) solution.
5. Filter the diluted extract through a glass microfibre filter paper.
6. Pass 10 ml of the diluted filtrate (equivalent to 0.2 g of sample) through the column at a flow rate of 2 ml per minute (or the sample can be allowed to pass through the column by gravity if preferred). A slow, steady flow rate is essential for the capture of the toxins by the antibody.
7. Wash the column by passing 10 ml of 0.1 % Tween 20 in 10 mM phosphoric acid (pH 7.4) through, followed by 10 ml of 10 mM phosphoric acid (pH 7.4) at a flow rate of approximately 5 ml per minute. Pass air through the column to remove residual liquid.
8. Elute the toxin from the column at a flow rate of 1 drop per second using 1 ml of 100 % methanol and collect in an amber glass vial. Please refer to the Elution section for further information.
9. Following elution pass 1 ml of water through the column and collect in the same vial to give a 2 ml total volume.
10. Inject 100  $\mu$ l onto the HPLC system.



## Sample Preparation

### • Red Yeast Rice

1. Weigh 2 g of ground sample into a centrifuge tube.
2. Add 40 ml of 100 % methanol.
3. Vortex for 30 seconds or place on an orbital shaker for 30 minutes.
4. Incubate the sample in a shaking water bath at 60 °C for 15 minutes. Vortex for 30 seconds after 5 minutes.
5. Filter the sample through Whatman No. 113 or No. 4 filter paper, or centrifuge at 4,000 rpm for 10 minutes.
6. Dilute 5 ml of filtrate with 45 ml of phosphate buffered saline (PBS) solution.
7. Filter the diluted extract through a glass microfibre filter paper.
8. Pass 20 ml of the diluted filtrate (equivalent to 0.1 g of sample) through the column at a flow rate of 2 ml per minute (or the sample can be allowed to pass through the column by gravity if preferred). A slow, steady flow rate is essential for the capture of the toxins by the antibody.
9. Wash the column by passing 20 ml of 0.1 % Tween 20 in 10 mM phosphoric acid (pH 7.4) through, followed by 10 ml of 10 mM phosphoric acid (pH 7.4) at a flow rate of approximately 5 ml per minute. Pass air through the column to remove residual liquid.
10. Elute the toxin from the column at a flow rate of 1 drop per second using 1 ml of 100 % methanol and collect in an amber glass vial. Please refer to the Elution section for further information.
11. Following elution pass 1 ml of water through the column and collect in the same vial to give a 2 ml total volume.
12. Inject 100 µl onto the HPLC system.

## Preparation of Standards

Preparation of 1,000 ng/ml citrinin stock solution:

1. Citrinin standards can be purchased. Contact your local R-Biopharm distributor for further information. If required, dilute or reconstitute as per the instructions provided and leave overnight in the dark at room temperature to give a stock concentrate.
2. This is then used to prepare a 1,000 ng/ml citrinin stock solution.

## Calibration Curve

It is recommended to run at least a 3 - 6 point calibration curve. In constructing a suitable curve the levels of the calibration standards should bracket or include the range of expected results. The diluted standard solutions should be prepared fresh on the day of analysis and used within a 24 hour period.

Example of how to prepare a five point calibration curve (can be modified according to legislative requirements or contamination levels):

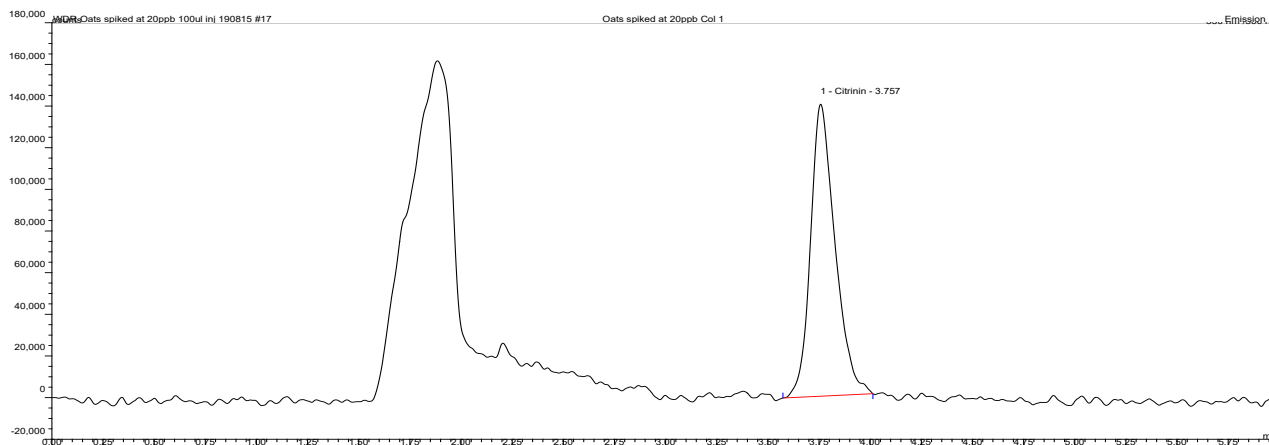
1. Standard 5: Take 80  $\mu$ l of 1,000 ng citrinin stock solution and make up to 5 ml with 100 % methanol and add 5 ml of water (equivalent to 8 ng/ml).
2. Standard 4: Take 5 ml of 8 ng/ml and add 5 ml of 50 % methanol (equivalent to 4 ng/ml).
3. Standard 3: Take 5 ml of 4 ng/ml and add 5 ml of 50 % methanol (equivalent to 2 ng/ml).
4. Standard 2: Take 5 ml of 2 ng/ml and add 5 ml of 50 % methanol (equivalent to 1 ng/ml).
5. Standard 1: Take 5 ml of 1 ng/ml and add 5 ml of 50 % methanol (equivalent to 0.5 ng/ml).
6. Inject 100  $\mu$ l of each standard onto the HPLC system.

## Recommended HPLC Conditions

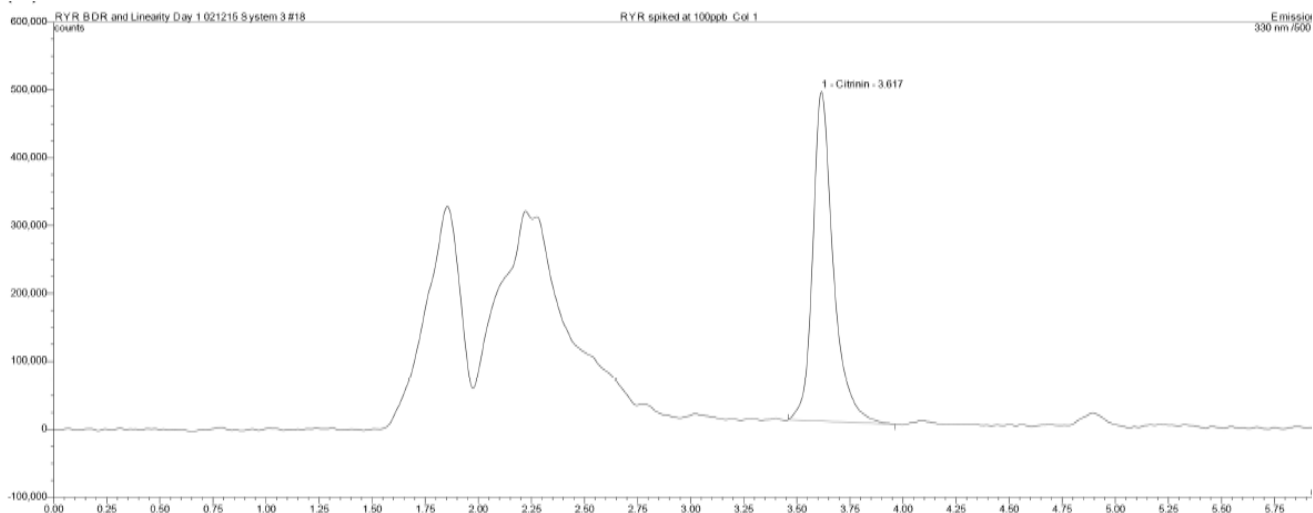
HPLC Conditions	
Guard Cartridge	Hypersil GOLD™ 3 µm, 4 mm x 10 mm (Thermo) or equivalent
Analytical Column	Hypersil GOLD™ 3 µm, 4.6 mm x 150 mm (Thermo) or equivalent
Mobile Phase	10 mM Phosphoric Acid (pH 2.5) : Acetonitrile (50 : 50 v/v)
HPLC Pump	To deliver mobile phase
Flow Rate	1.0 ml/minute
Fluorescence Detector	Excitation: 330 nm Emission: 500 nm
Column Heater	Maintain guard and analytical columns at 40 °C
Integrator / Data Control System	From preferred supplier
Injector	Autosampler / Rheodyne valve
Injection Volume	100 µl

# Typical HPLC Trace for Analysis of Citrinin Using EASI-EXTRACT® CITRININ Immunoaffinity Columns

- Oats (Spiked at 20 ppb)



- Red Yeast Rice (Spiked at 100 ppb)



## Quality

RBR products are developed, manufactured, tested and dispatched under an ISO 9001 registered Quality Management System, guaranteeing a consistent product, which always meets our performance specifications. Our products have been used in many collaborative studies to develop standard European and International Methods and are widely used by key institutions, food companies and government laboratories. Customer references for RBR products are available on request.

## Technical support

RBR understand that from time to time users of our products may need assistance or advice. Therefore, we are pleased to offer the following services to our customers:

- Analysis of problem samples.
- Application notes for difficult samples.
- References from the RBR library.
- Installation and support of the KOBRA® CELL.
- Advice on detection parameters.
- Advice on preparation and handling of standards.
- Updates on legislation, sampling and other news by e-mail.
- Provision of spiked samples.

Please contact your local R-Biopharm distributor for further information.

## Warranty

R-Biopharm Rhône Ltd makes no warranty of any kind, express or implied, except that all products made by R-Biopharm Rhône Ltd are made with materials of suitable quality. If any materials are defective, R-Biopharm Rhône Ltd will provide a replacement product. The user assumes all risk and liability resulting from the use of R-Biopharm Rhône Ltd products and procedures. R-Biopharm Rhône Ltd shall not be liable for any damages, including special or consequential damages, loss or expense arising directly or indirectly from the use of R-Biopharm Rhône Ltd products or procedures.





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