



Residue Analysis: Ethylene Oxide

Ethylene oxide is a highly toxic and reactive gas used to kill animal pests in warehouses and overseas containers. Due to its bactericidal and fungicidal effect, it is also still used to sterilise seeds, spices and other heat-sensitive food raw materials in large parts of the world - especially in Asia, but also in the USA.

RESIDUES OF ETHYLENE OXIDE DETECTED IN VARIOUS PRODUCTS

In the EU the use of the fumigant, which is classified as a pesticide and biocide, has been banned for food applications since 1981. It may still be used for disinfection if contact with food is safely excluded.

In August 2020, the first reports of illegal use of ethylene oxide in sesame seeds became known.

A warning via the European **Rapid Alert System (RASFF)** from Belgium in September 2020 then triggered a wave of investigations into residues of the active substance and its degradation product (2-chloroethanol).



The highly contaminated sesame seeds from India were presumably intended to be particularly effectively protected against salmonella infestation. The EU Commission then tightened the import conditions for sesame seeds from India and increased the control frequency for imports.

After numerous complaints regarding the microbiological condition the EU had already tightened the import conditions beforehand. The goods were quickly distributed via branched trade routes and subsequently already processed in many products before the contamination was detected. Numerous product recalls and costly destruction of goods were and still are the result.

In the meantime, residues of ethylene oxide/2-chloroethanol have also been discovered in spices (e.g. pepper, turmeric, ginger powder).

While ethylene oxide itself decomposes quickly as a reactive gas, its main degradation product is chemically stable and no less toxic, albeit in a different way.

Link to RASFF - Illegal use of ethylene oxide: https://ec.europa.eu/food/safety/rasff/ethylene-oxide-incident_en

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THE EU MAXIMUM RESIDUE REGULATION

The **EU Maximum Residue Regulation (EC) No. 396/2005** defines the maximum residue level in relation to the sum parameter of the active substance ethylene oxide itself and its metabolite 2-chloroethanol, which is formed upon reaction with chlorides and chlorine-containing compounds.

The result is expressed in the analysis report as „sum of ethylene oxide and 2-chloroethanol“.

Code number	Groups and examples of individual products to which the MRLs apply	Current MRL [mg/kg]
0100000	FRUITS, FRESH or FROZEN; TREE NUTS	0.02
0120000	except : Tree nuts	0.05
0200000	VEGETABLES, FRESH or FROZEN	0.02
0300000	PULSES	0.02
0400000	OILSEEDS AND OIL FRUITS *	0.05
0500000	CEREALS	0.02
0600000	TEAS, COFFEE, HERBAL INFUSIONS, COCOA AND CAROBS	0.10
0800000	SPICES	0.10

For detailed data please refer to: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015R0868>

*Note: Sesame belongs to OILSEEDS AND OIL FRUITS

YOUR PLUS: ACCREDITED ANALYTICS WITH HIGH MEASUREMENT CAPACITY AND SHORT TURNAROUND TIMES

Our special laboratory for feed and food AGROLAB LUFA GmbH offers the analysis of ethylene oxide and 2-chloroethanol accredited according to the current EURL method publication with high measurement capacity and short turnaround times.



In this analytical method, ethylene oxide and 2-chloroethanol are determined side by side and quantified by GC-MS/MS.

Depending on the matrix, the work-up is carried out using QuEChERS or QuOil. The method allows a high daily sample throughput. We offer accredited analysis for ethylene oxide and 2-chloroethanol within 4 working days as standard. **A 24-hour express service** is available on request with an additional charge - in very urgent cases, same-day reporting can be provided after prior confirmation.

To order tests for ethylene oxide and 2-chloroethanol, please contact the sales representative in the AGROLAB GROUP responsible for you. You do not know this person? With the help of the contact finder on our website (right side) you can find your contact person.



TIP: Get free, no-obligation advice from our experts regarding a comprehensive, risk-based analysis plan for your products.

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