FOOD ANALYSIS

# DETERMINATION OF MULTI-PESTICIDE RESIDUES IN RED CHILI POWDER USING QUECHERS AND THE AGILENT 7000 SERIES TRIPLE QUADRUPOLE GC/MS SYSTEM

The Measure of Confidence

**Solutions for Your Analytical Business -** Markets and Applications Programs


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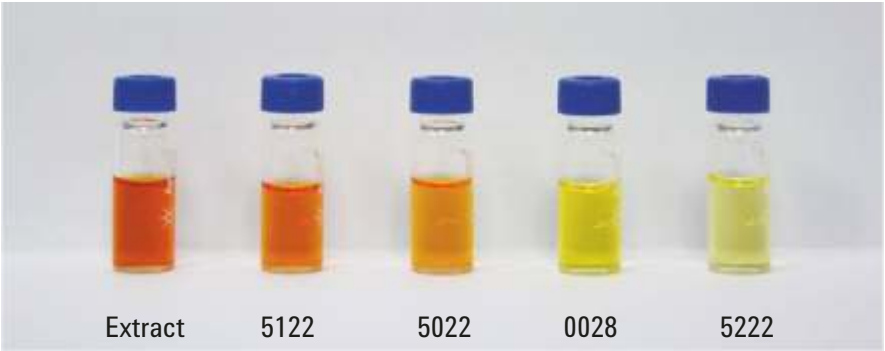
A validated method has been developed for the analysis of 90 pesticides in dried red chili powder using the QuEChERS sample preparation technique and the Agilent 7000 GC-Triple Quadrupole Mass Spectrometer, with a run time of 20.75 minutes.


Analysis of pesticide residues in red chili powder is a real analytical challenge due to its complex matrix and required maximum residue levels (MRL). Sample preparation was optimized in order to eliminate pigment and other co-extractives which could cause retention time shifting, affect chromatographic peak shape and cause loss of sensitivity of the target analytes.




Extract and four different dispersive clean up; 5222 kits removing more pigments and consequently enhance column, liner life & source cleaning. The recovery for the majority of the compounds is between 70-120%

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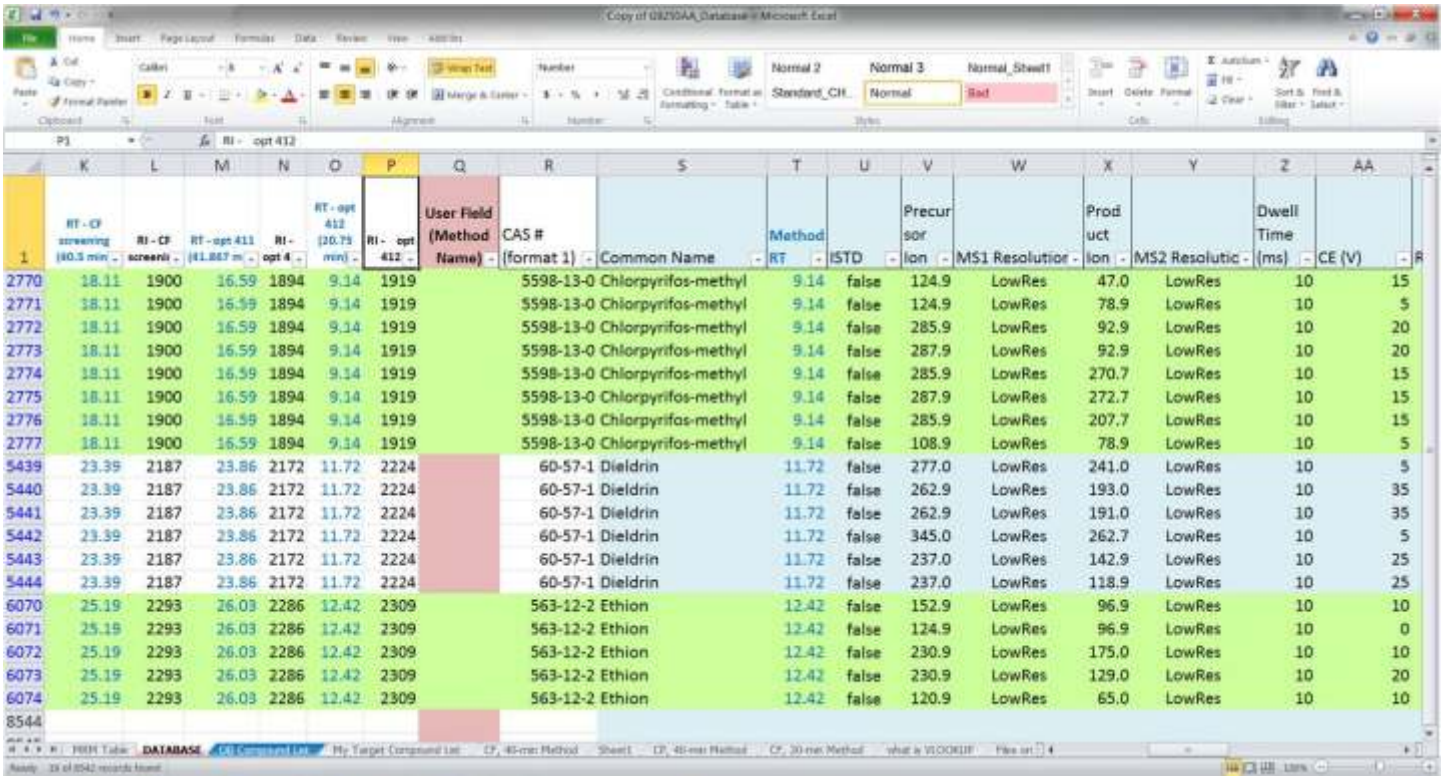
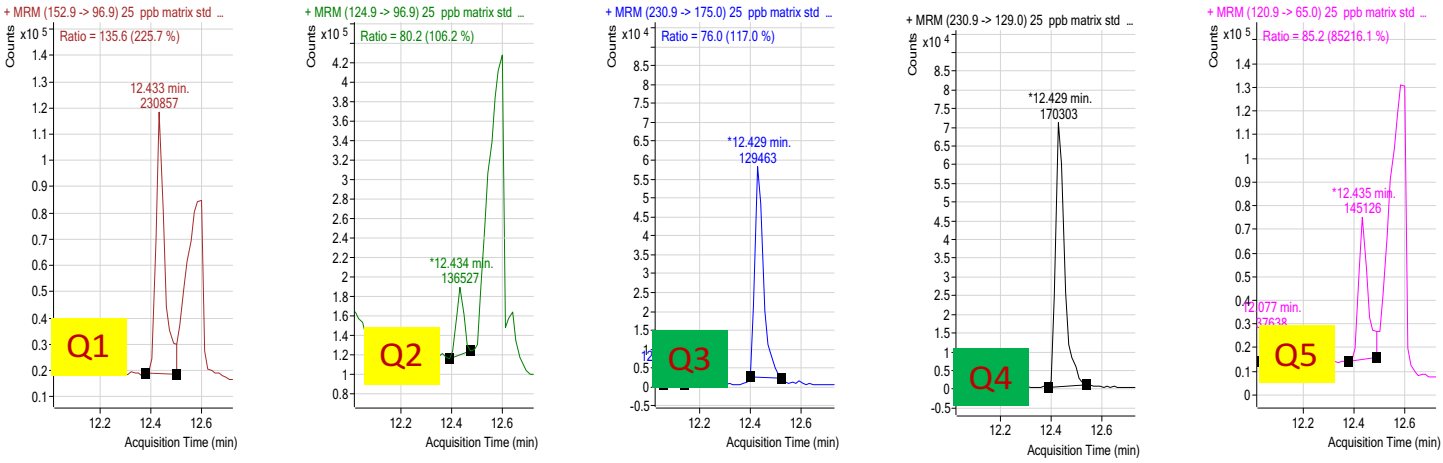


| | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | RT - CF screening (40.5 min) | RI - CF screening | RT - opt 411 (41.867 m | RI - opt 4 | RT - opt 412 (20.75 min) | RI - opt 412 | User Field (Method Name) | CAS # (format 1) | Common Name | Method RT | ISTD | Precursor Ion | MS1 Resolution | Product Ion | MS2 Resolution | Dwell Time (ms) | CE (V) |
| 2770 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 124.9 | LowRes | 47.0 | LowRes | 10 | 15 |
| 2771 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 124.9 | LowRes | 78.9 | LowRes | 10 | 5 |
| 2772 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 285.9 | LowRes | 92.9 | LowRes | 10 | 20 |
| 2773 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 287.9 | LowRes | 92.9 | LowRes | 10 | 20 |
| 2774 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 285.9 | LowRes | 270.7 | LowRes | 10 | 15 |
| 2775 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 287.9 | LowRes | 272.7 | LowRes | 10 | 15 |
| 2776 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 285.9 | LowRes | 207.7 | LowRes | 10 | 15 |
| 2777 | 18.11 | 1900 | 16.59 | 1894 | 9.14 | 1919 | | 5598-13-0 | Chlorpyrifos-methyl | 9.14 | false | 108.9 | LowRes | 78.9 | LowRes | 10 | 5 |
| 5439 | 23.39 | 2187 | 23.86 | 2172 | 11.72 | 2224 | | 60-57-1 | Dieldrin | 11.72 | false | 277.0 | LowRes | 241.0 | LowRes | 10 | 5 |
| 5440 | 23.39 | 2187 | 23.86 | 2172 | 11.72 | 2224 | | 60-57-1 | Dieldrin | 11.72 | false | 262.9 | LowRes | 193.0 | LowRes | 10 | 35 |
| 5441 | 23.39 | 2187 | 23.86 | 2172 | 11.72 | 2224 | | 60-57-1 | Dieldrin | 11.72 | false | 262.9 | LowRes | 191.0 | LowRes | 10 | 35 |
| 5442 | 23.39 | 2187 | 23.86 | 2172 | 11.72 | 2224 | | 60-57-1 | Dieldrin | 11.72 | false | 345.0 | LowRes | 262.7 | LowRes | 10 | 5 |
| 5443 | 23.39 | 2187 | 23.86 | 2172 | 11.72 | 2224 | | 60-57-1 | Dieldrin | 11.72 | false | 237.0 | LowRes | 142.9 | LowRes | 10 | 25 |
| 5444 | 23.39 | 2187 | 23.86 | 2172 | 11.72 | 2224 | | 60-57-1 | Dieldrin | 11.72 | false | 237.0 | LowRes | 118.9 | LowRes | 10 | 25 |
| 6070 | 25.19 | 2293 | 26.03 | 2286 | 12.42 | 2309 | | 563-12-2 | Ethion | 12.42 | false | 152.9 | LowRes | 96.9 | LowRes | 10 | 10 |
| 6071 | 25.19 | 2293 | 26.03 | 2286 | 12.42 | 2309 | | 563-12-2 | Ethion | 12.42 | false | 124.9 | LowRes | 96.9 | LowRes | 10 | 0 |
| 6072 | 25.19 | 2293 | 26.03 | 2286 | 12.42 | 2309 | | 563-12-2 | Ethion | 12.42 | false | 230.9 | LowRes | 175.0 | LowRes | 10 | 10 |
| 6073 | 25.19 | 2293 | 26.03 | 2286 | 12.42 | 2309 | | 563-12-2 | Ethion | 12.42 | false | 230.9 | LowRes | 129.0 | LowRes | 10 | 20 |
| 6074 | 25.19 | 2293 | 26.03 | 2286 | 12.42 | 2309 | | 563-12-2 | Ethion | 12.42 | false | 120.9 | LowRes | 65.0 | LowRes | 10 | 10 |
| 8544 | | | | | | | | | | | | | | | | | |

Mass spectrometric parameters were set up using the Agilent Pesticide and Environmental Contaminants Database (G9250AA). Target analyte MS/MS (or MRM) transitions were selected in order to give the best selectivity against the matrix as below.




All the available transitions from the database were analyzed for each compound, Q3 and Q4 were selected based on consistent response in longer batch analysis and for ease of integration.

To prolong the system stability and uptime, the Capillary Flow Technology was used to back flush the column to achieve a faster cycle time & decrease GC maintenance. The validation was carried out using 11 level matrix matched standards, 3 level recoveries.

Customers can adapt this instrumental method to their Agilent equipment quickly by running the built-in retention time locking (RTL) tool in MassHunter software to regenerate the same retention time as the master method. Pigments were effectively removed from the sample by utilizing the QuEChERS sample preparation method, decreasing the need for frequent liner changes, column trimming and source cleaning.

## Customer's Experience

"Agilent Pesticide Database and built-in Retention Time Locking system had helped us to set-up method for our targeted compounds faster. Especially which provides an option of Choosing matrix free MRM transition. The real challenge of reducing pigments with required recovery been achieved by the use of suitable clean-up material. As a result, a reliable performance is achieved in the quantification of 90 analytes in Red Chili Powder by 7890A-7000 GC/MS/MS."

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"Using the factory configured Agilent GC/MS pesticide analyzer; we could quickly set up the instrumental method for our targeted compounds. The back flush option and optimized sample preparation technique improved the performance of the equipment to a large extent. Now, we are confident to handle trace level quantification in complex matrix."

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