

Influence of the antioxidant tocopherol on diafenthion recoveries using QuEChERS protocol

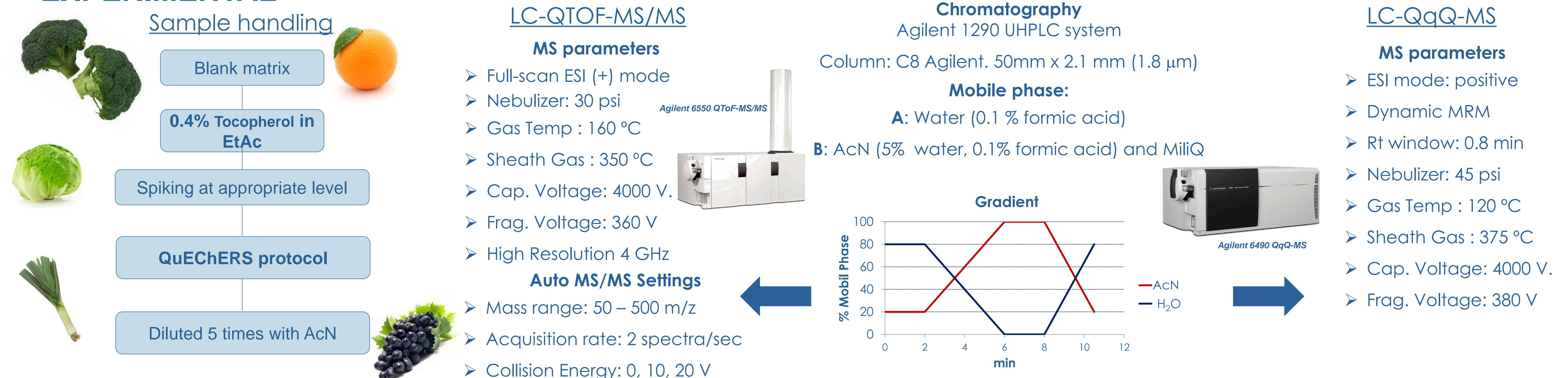
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INTRODUCTION

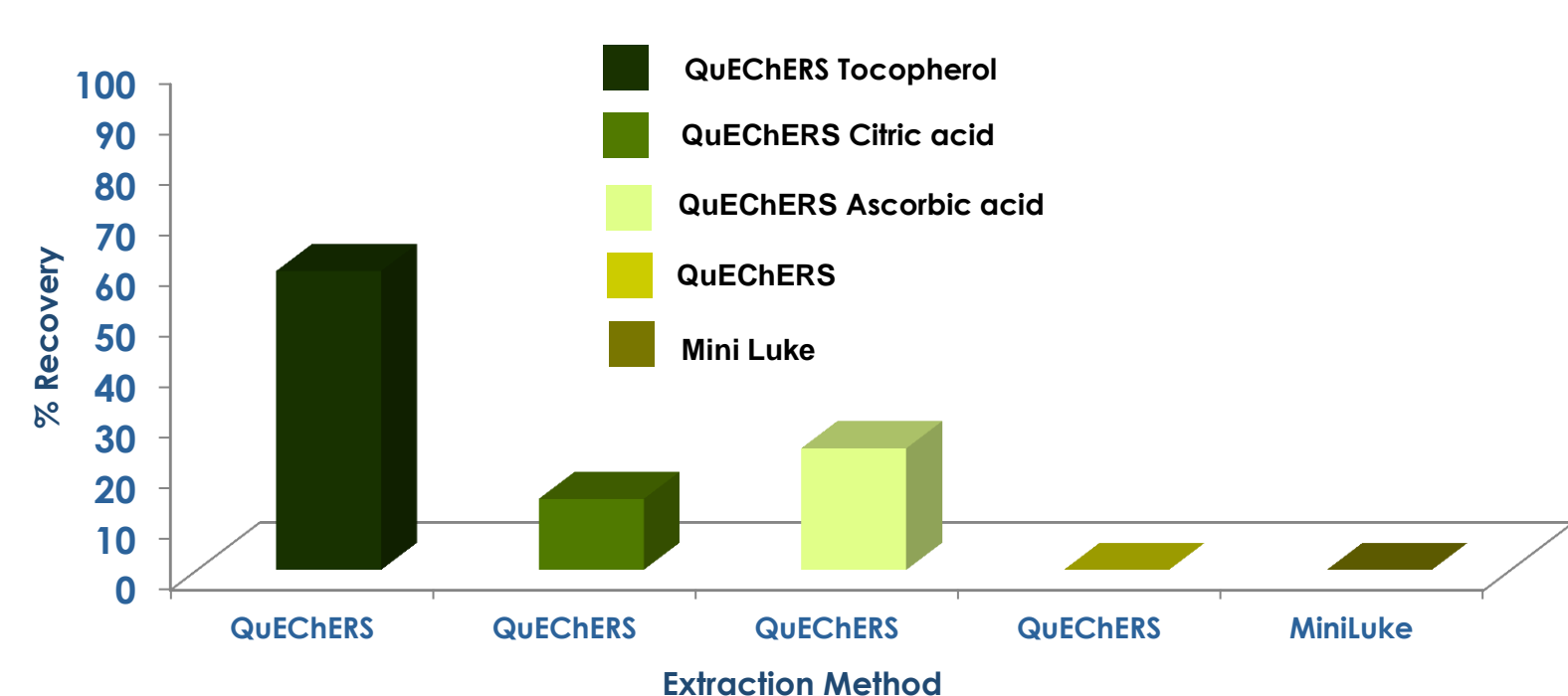
In general, the implementation of a multiresidue method in the laboratory assumes that a group of pesticides can present some difficulties for the adequate extraction level as consequence of specific interaction with the matrix or degradation processes. In the EUPT-SM07, where the broccoli was selected as matrix, diafenthion was only reported by 9% of the laboratories due to the degradation of this compound through the analytical process. The current study seeks to explain and overcome the detection problems for diafenthion in the scope of QuEChERS multiresidue method. Three antioxidant agents such as ascorbic acid, citric acid and tocopherol were evaluated in QuEChERS protocol to intend to increase of diafenthion recovery in different matrices. In addition, the stabilization of the compound after recoveries was also evaluated. Furthermore, other studies at different pHs (3, 5 and 9) or different solvents were conducted in order to avoid the observed degradation in matrix.

EXPERIMENTAL



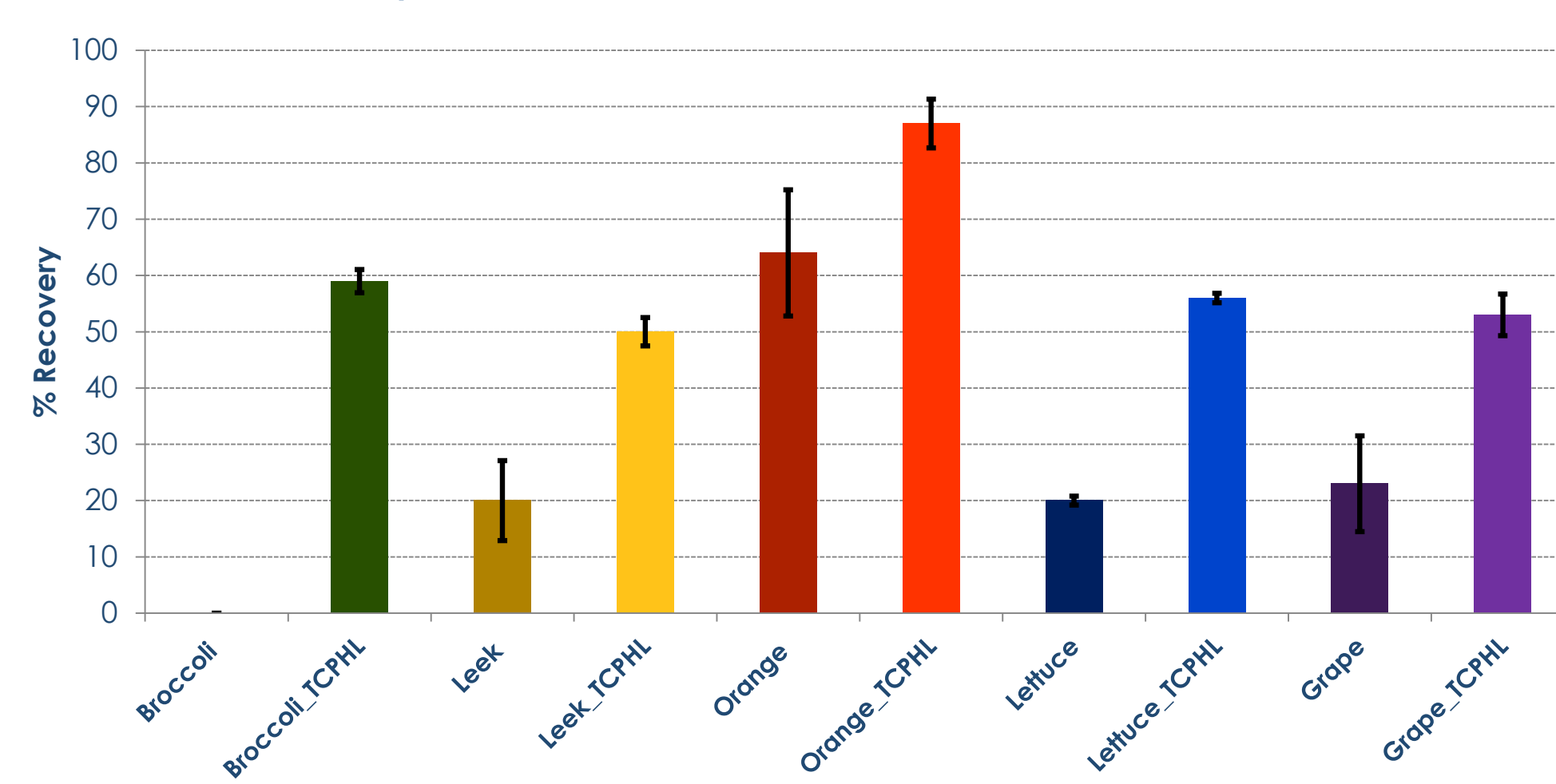
RESULTS

Recovery of diafenthion in broccoli



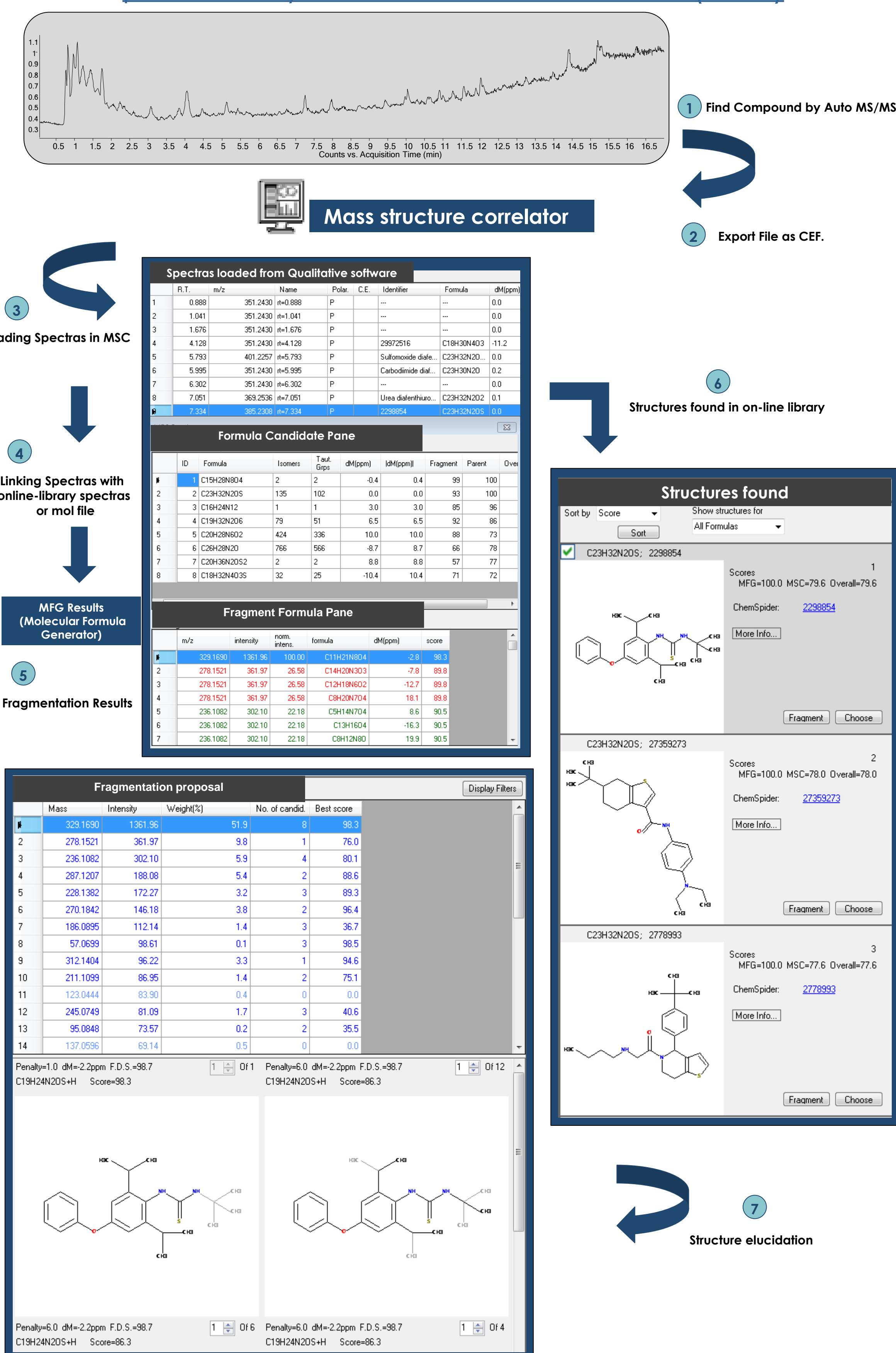
Recoveries of diafenthion by QuEChERS and Mini Luke extraction methods using different antioxidants

Recovery of diafenthion in different matrices

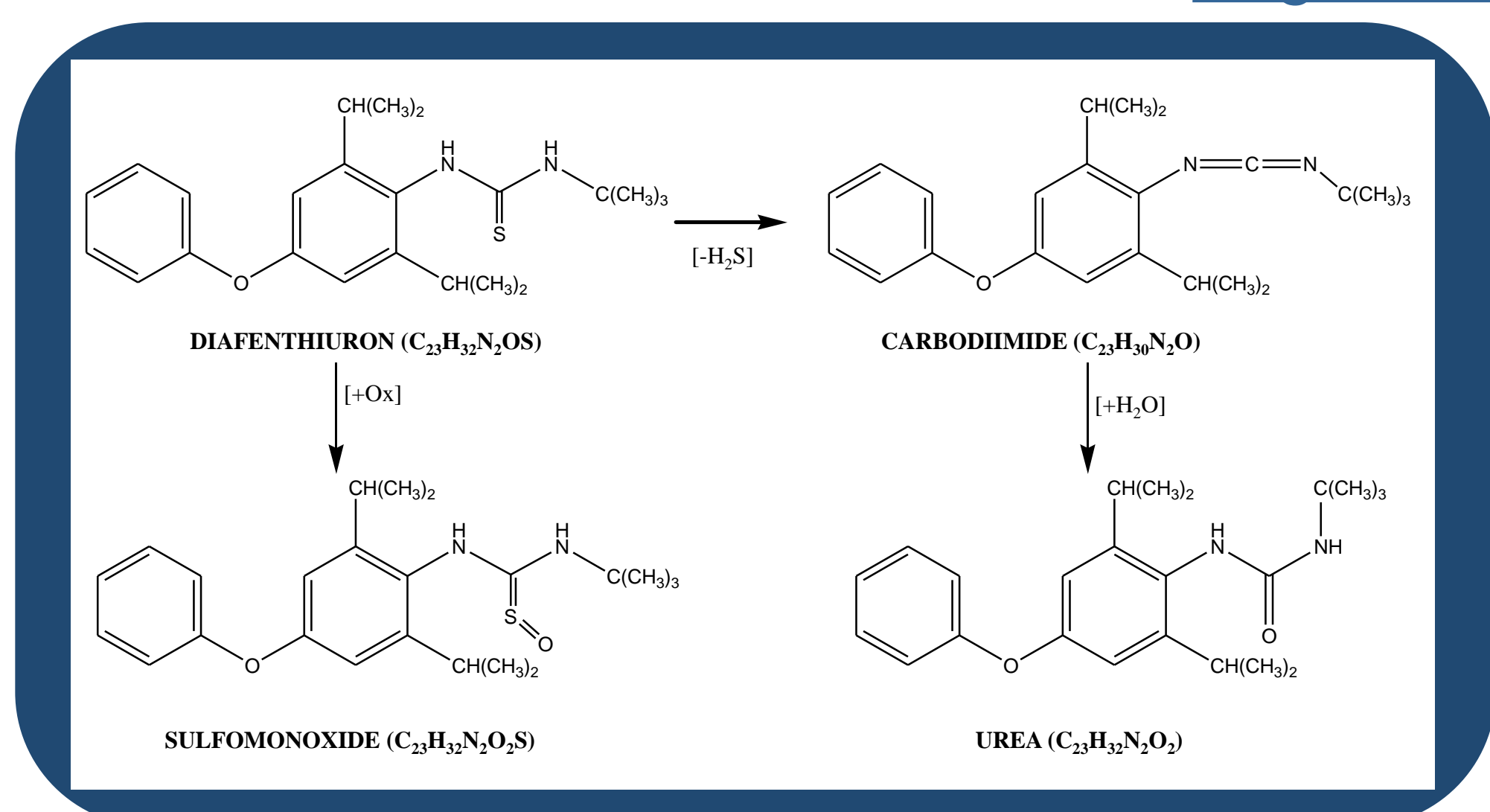


Recoveries of diafenthion and RSD(%) with/without TCPHL (Tocopherol) in different matrices

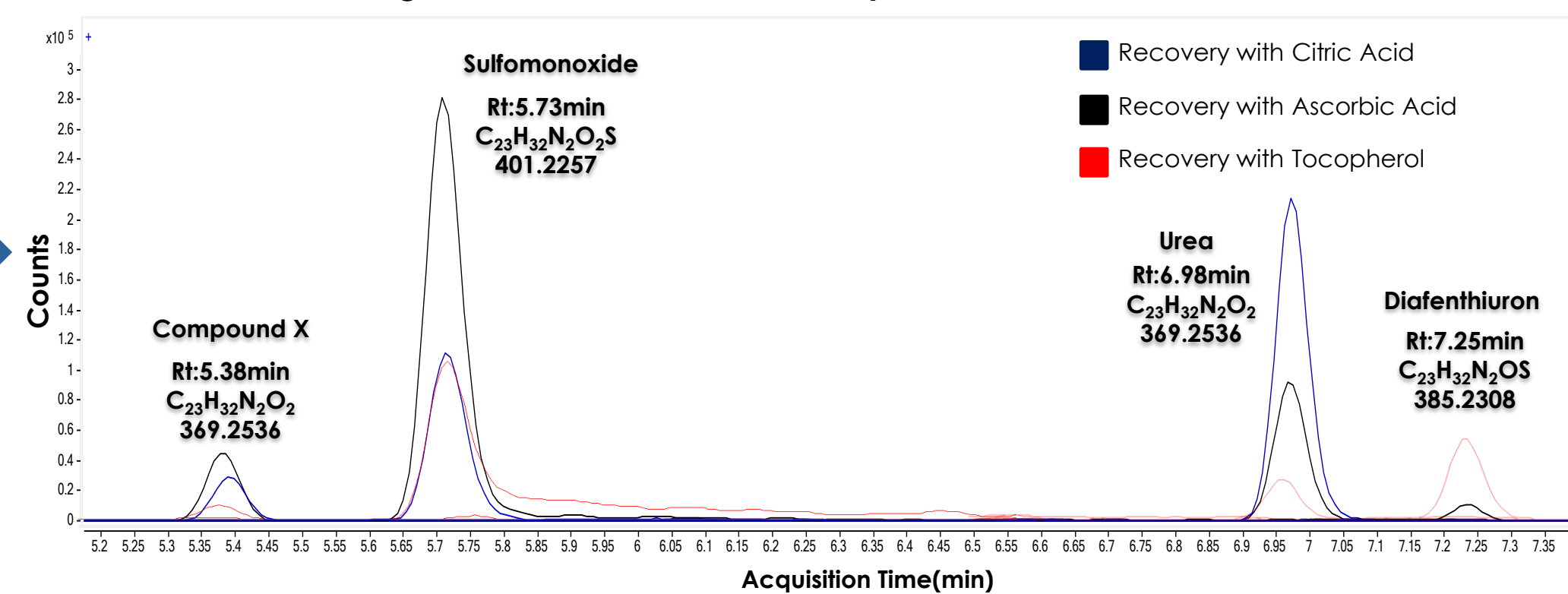
Identification of diafenthion and its main transformation products by Mass Structure Correlator (MSC)



Degradation of diafenthion in broccoli



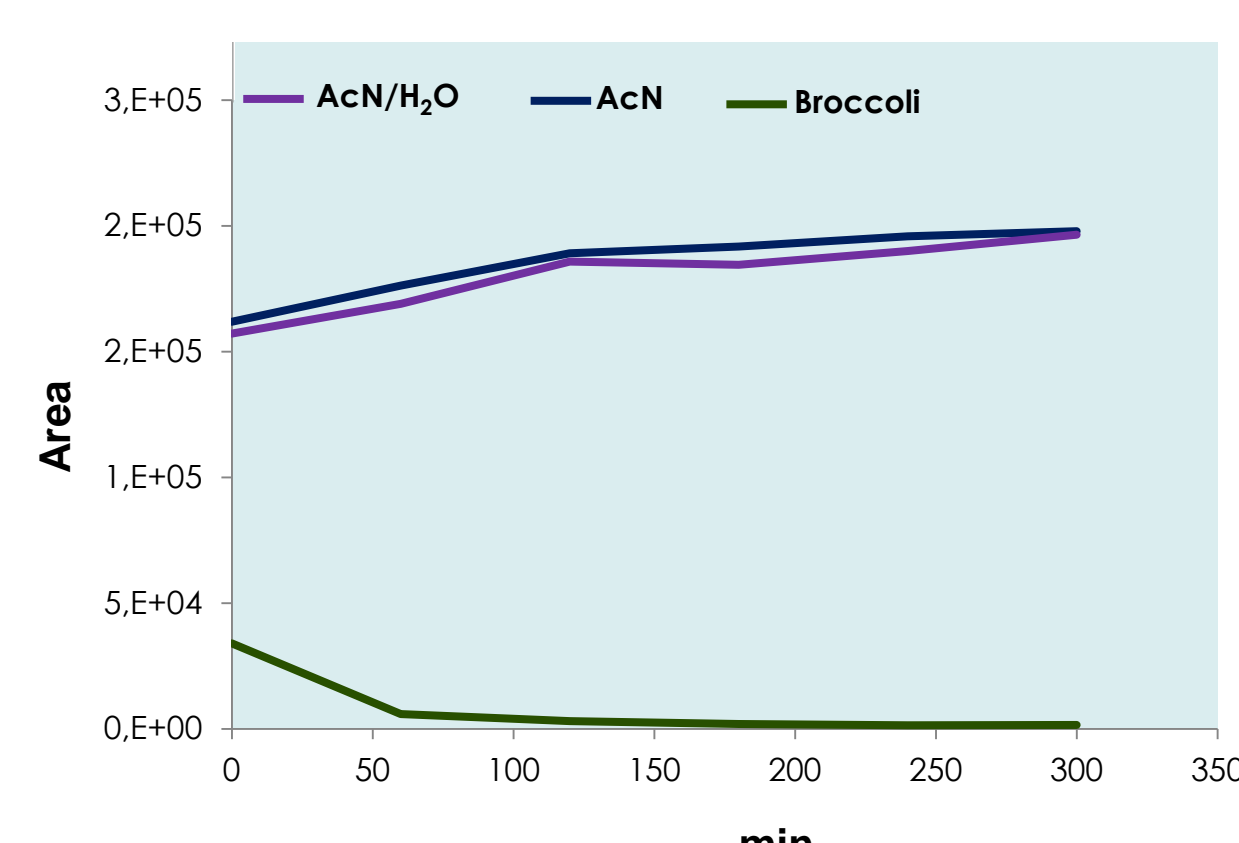
Extracted ion chromatogram of diafenthion recovery in broccoli



Extracted ion chromatogram of diafenthion and its main transformation product in broccoli

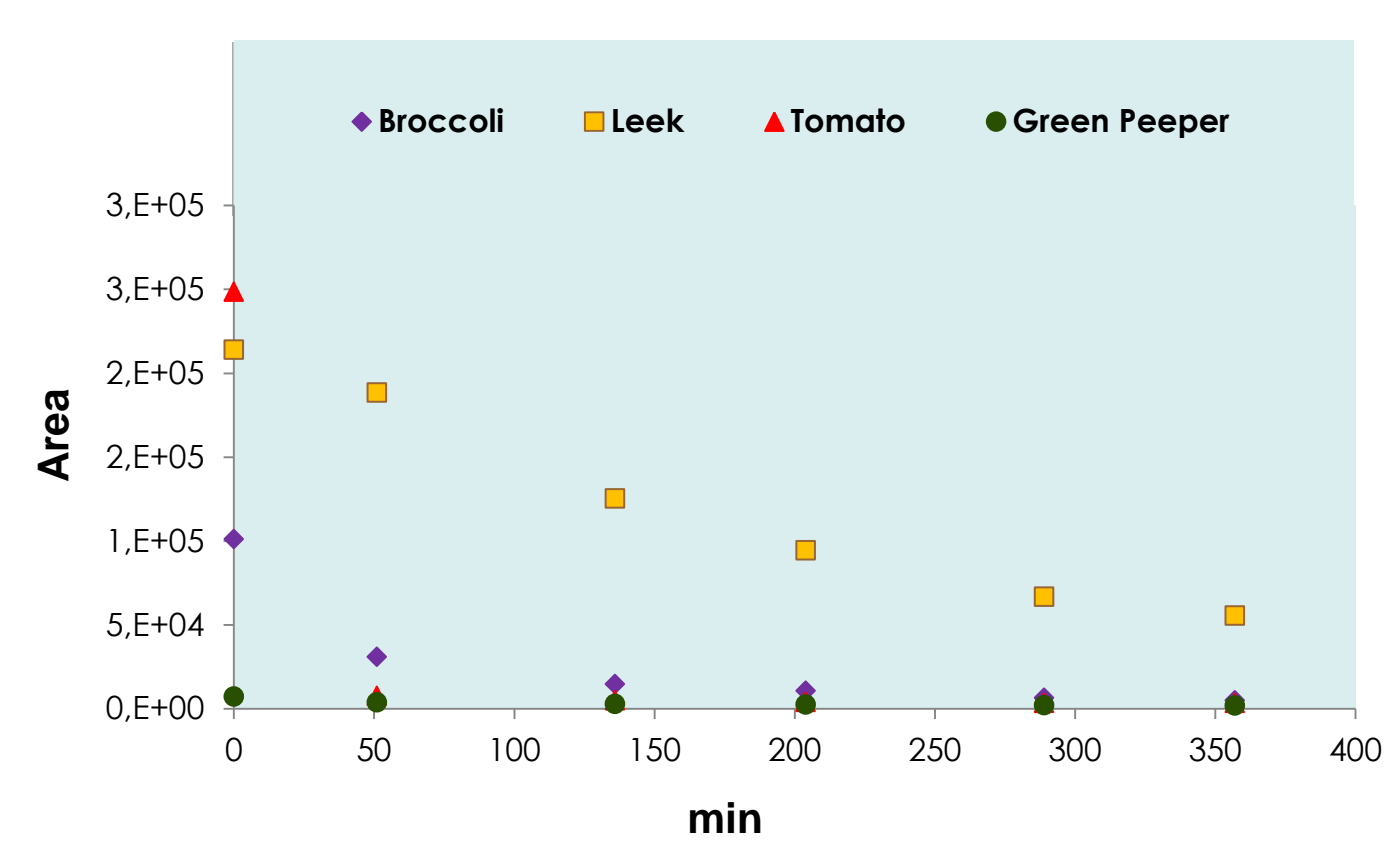
Stability of diafenthion

Stability of diafenthion in broccoli extract and solvent



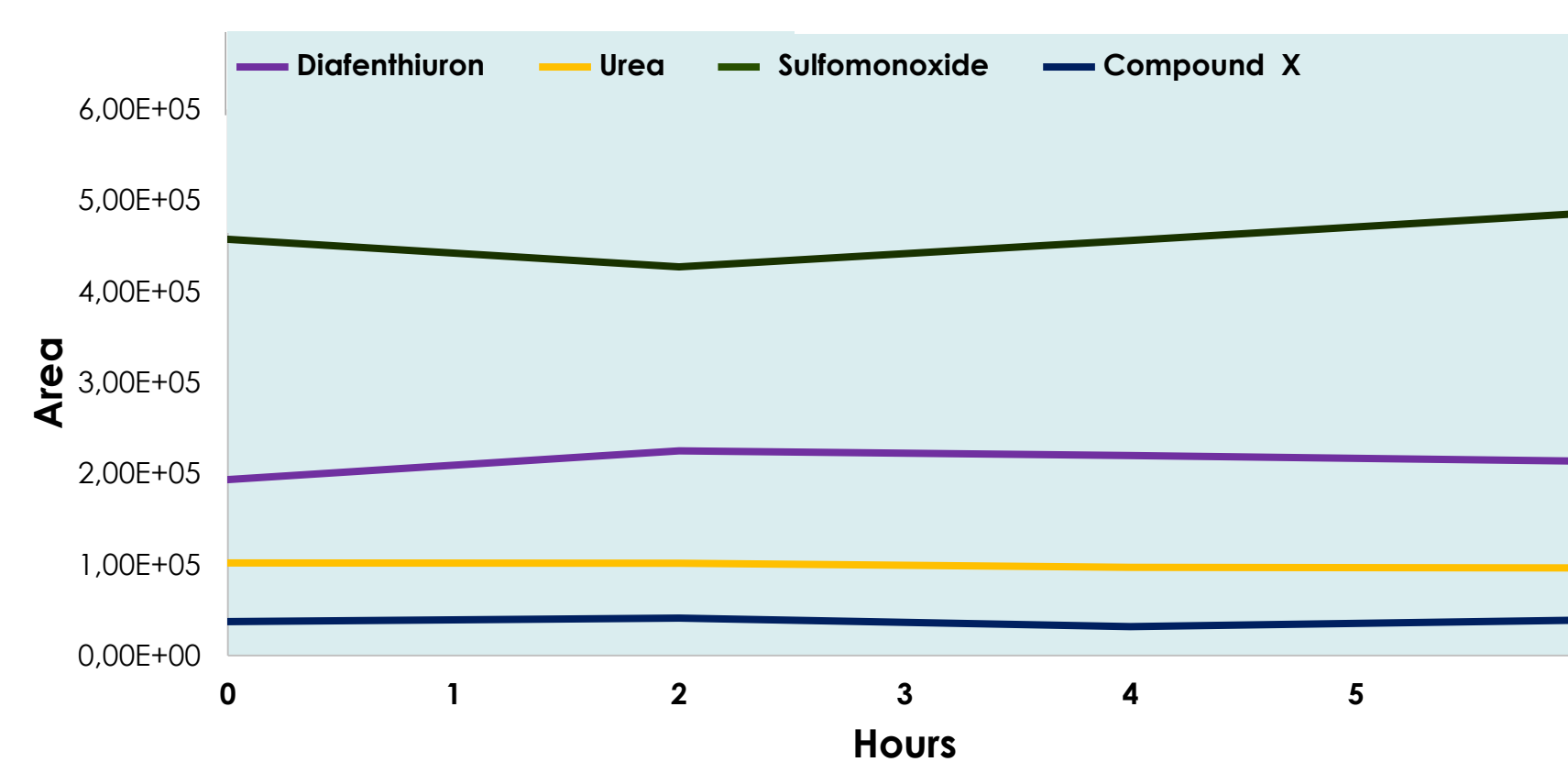
Stability of Diafenthion in solvent and broccoli matrix without tocopherol

Stability of diafenthion in different matrices



Stability of Diafenthion in different matrices without tocopherol

Stability of diafenthion in the recovery study with tocopherol



Stability in recovery study for Diafenthion in broccoli matrix with tocopherol

CONCLUSIONS

- The addition of 0.4% tocopherol allowed obtaining recoveries around 60% with good reproducibility in broccoli matrix.
- The recoveries in the rest of matrices were also increased. RSDs (%) lower than the RSDs in recoveries without tocopherol were achieved.
- The corresponding urea and sulfomonoxyde of diafenthion were detected in the samples after recoveries. However its carbodiimide was not detected in any evaluated sample.
- After several pHs studies, improvement in stability was not seen at the pHs evaluated therefore, the degradation of diafenthion is not related with pH.