



CRM STABILITY MONITORING OF ORGANIC CONTAMINANTS IN AVOCADO



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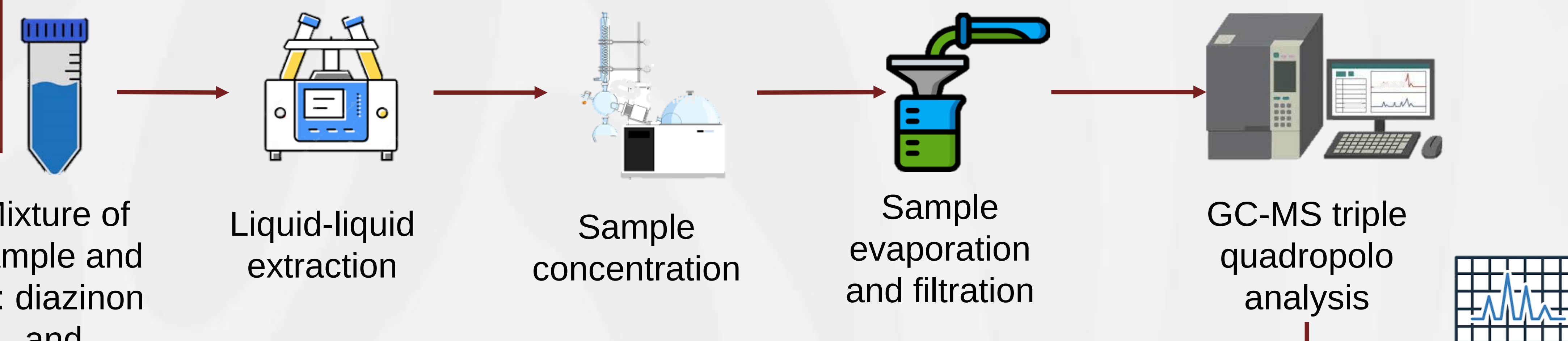
Introduction

Avocado cultivation is one of the most exported crops in Mexico, for this reason, national and international regulations are very strict regarding the use of pesticides. As part of the implementation of the standards, the use of reference materials is necessary to guarantee the sanitary conditions of agricultural products.

CRMs play a key role in implementing the concept of traceability of measurement results in chemistry. International Standard ISO 17034 establishes the requirements to produce reference materials. To assign values to the properties of a reference material, including the assessment of its associated uncertainty, and establish its metrological traceability, stability monitoring of reference materials is an important component of establishing such uncertainty associated with certified values.

The present monitoring of CRM of pesticides exposed in avocado matrix had the objective of warranting the components permanence in the matrix, following methodologies with metrological traceability. The pesticides analyzed in the monitoring were: malathion, methamidophos, monocrotophos, lambda cyhalothrin, cis permethrin, trans permethrin.

Methodology



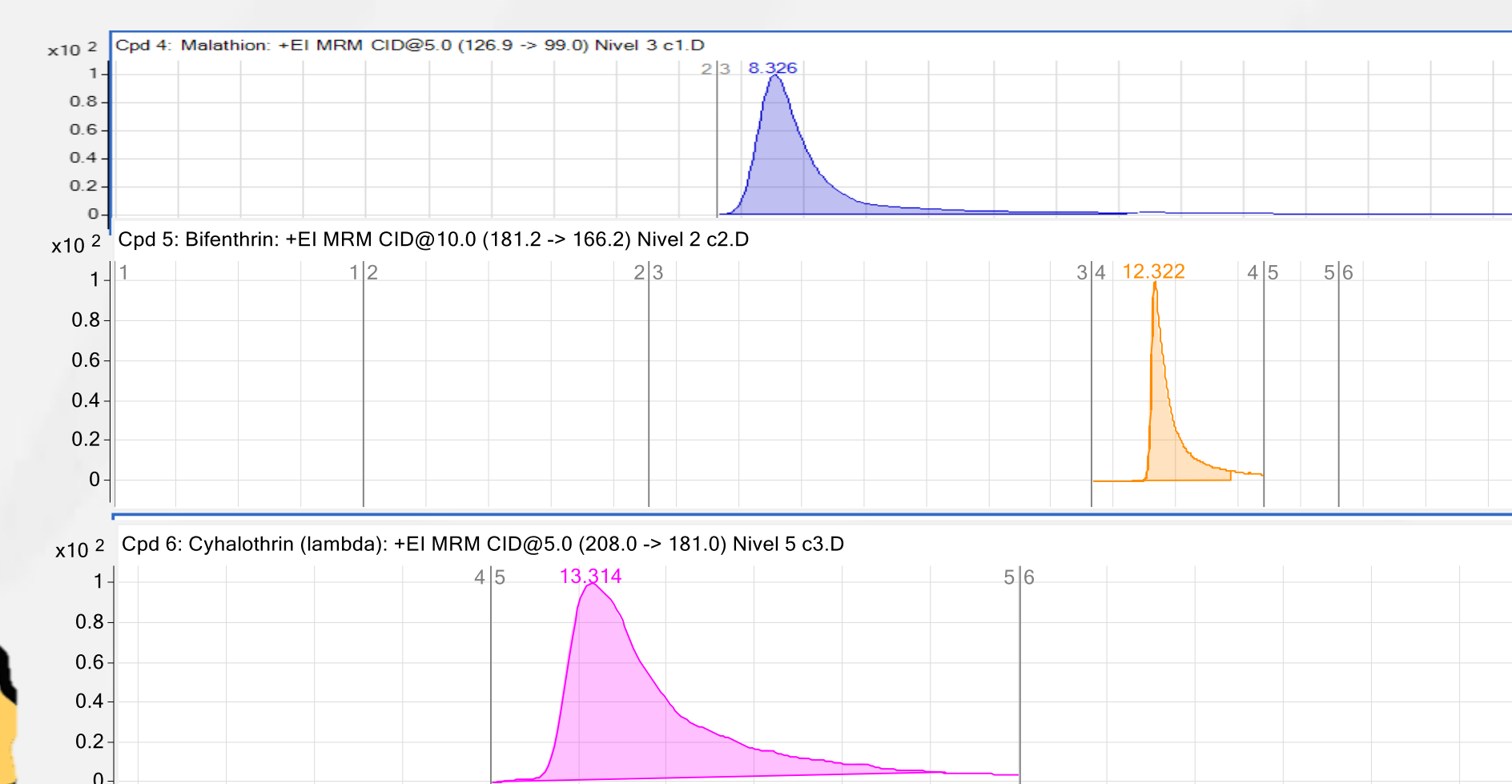
Mathematical models

Component quantification by linear fit $\rightarrow y = xb_1 + b_0$

Mass fraction determination $\rightarrow x = \left(\frac{y - b_0}{b_1} \right)$

Uncertainty determination $\rightarrow u(x) = \sqrt{\frac{s_{yy}}{b_1^2} \left(\frac{1}{p} + \frac{1}{n} + \frac{(x - \bar{x})^2}{S_{xx}} \right)}$

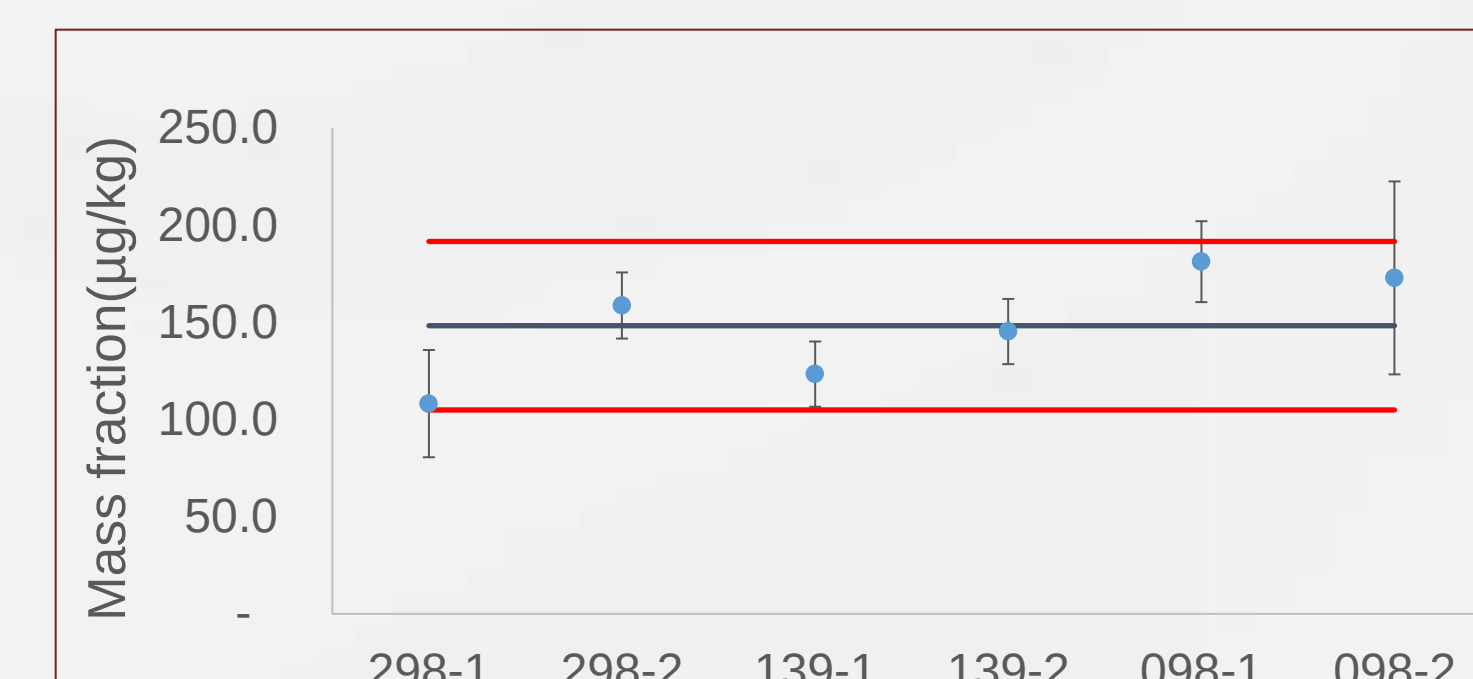
Analyzed compounds retention time	
Component	Retention time (min)
Malathion	8.65
Methamidophos	4.96
Monocrotophos	6.58
λ-cyhalothrin	13.31
Cis-permethrin	12.33
Trans-permethrin	14.08



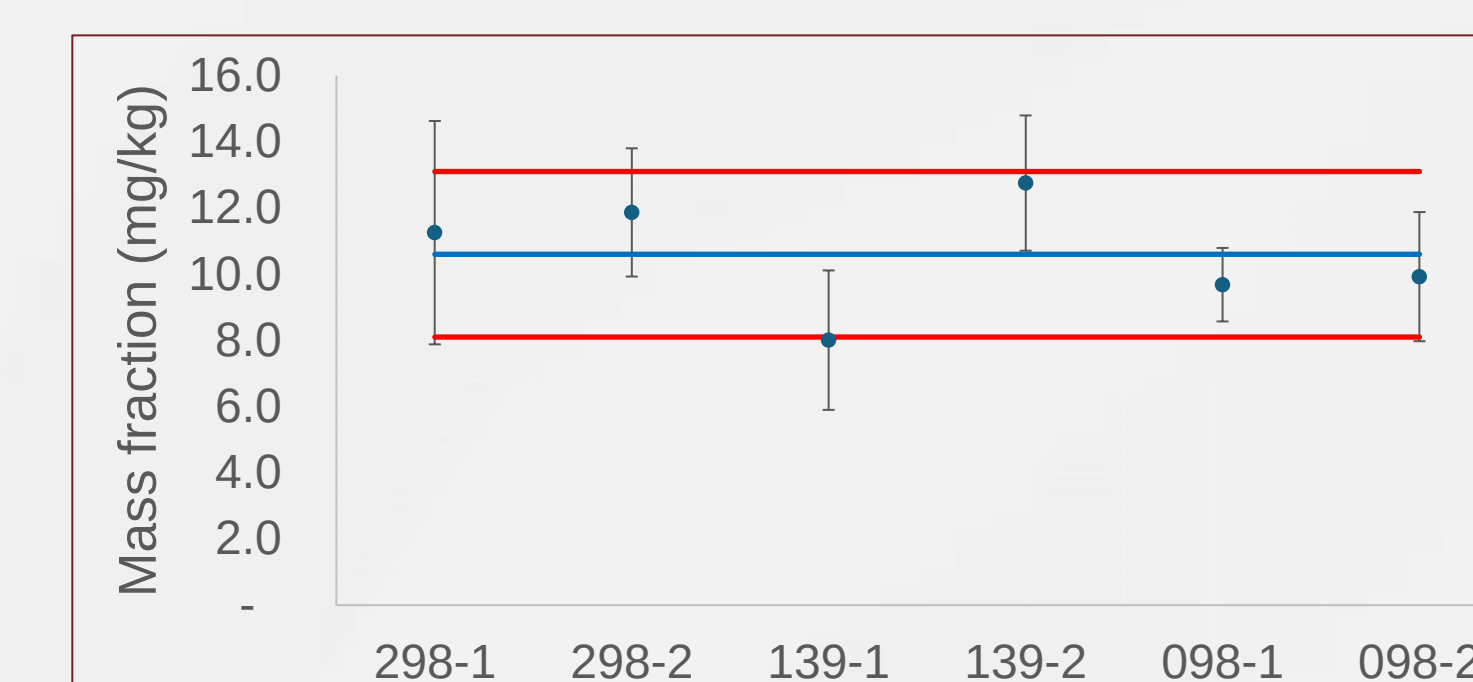
 Certificate of analysis

Results

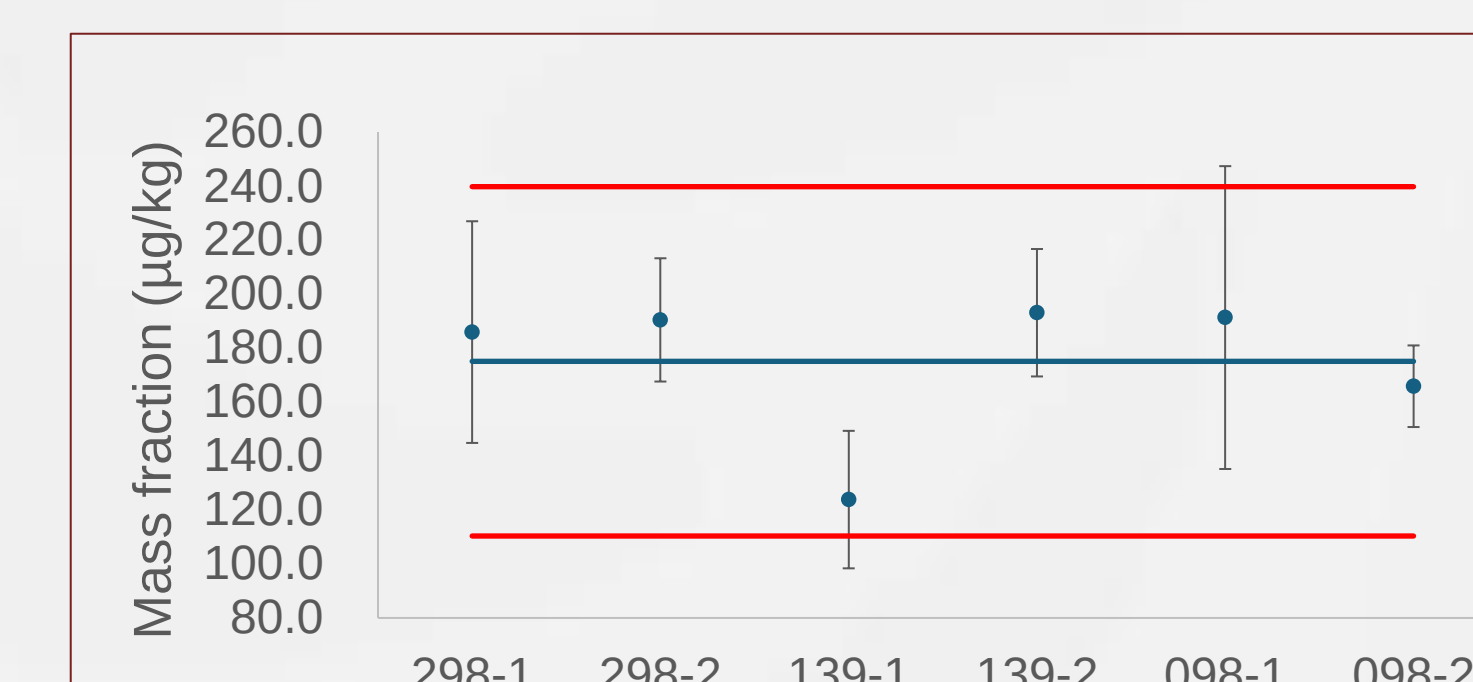
CRM monitoring main results



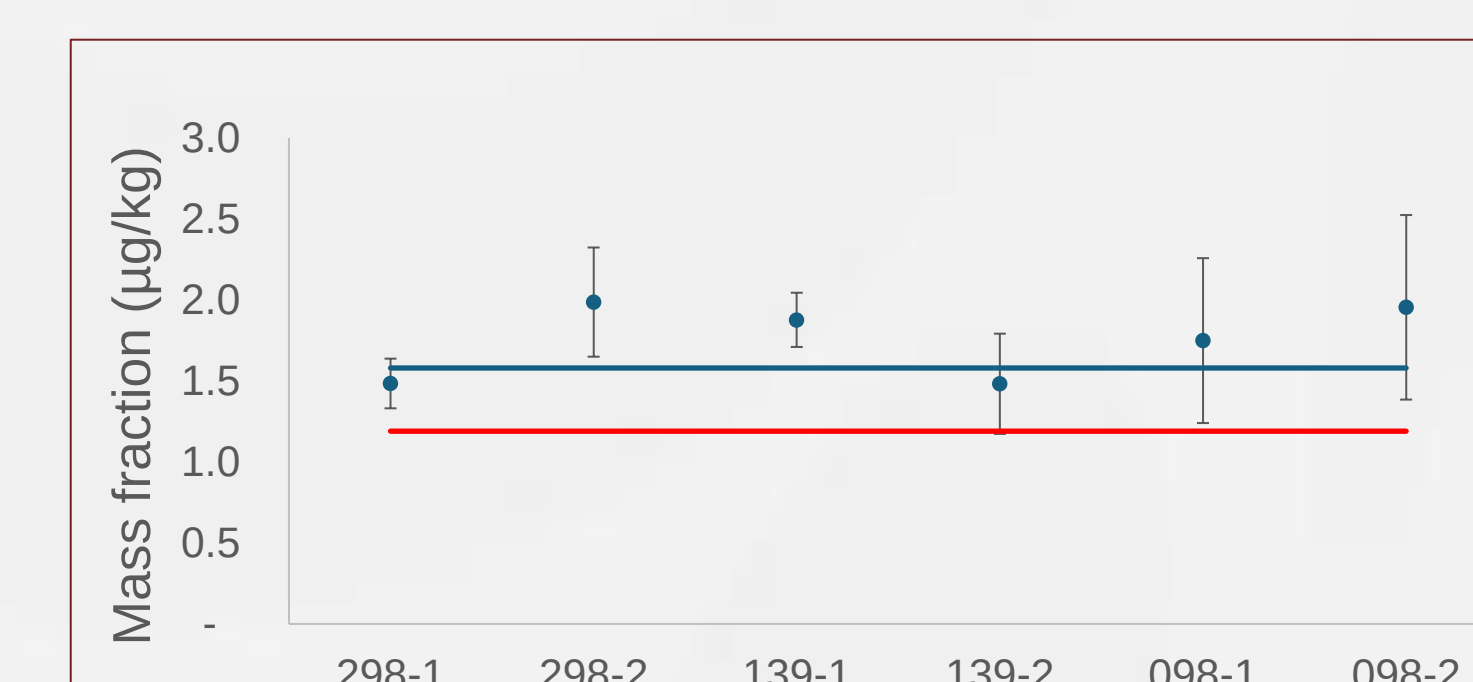
Methamidophos monitoring



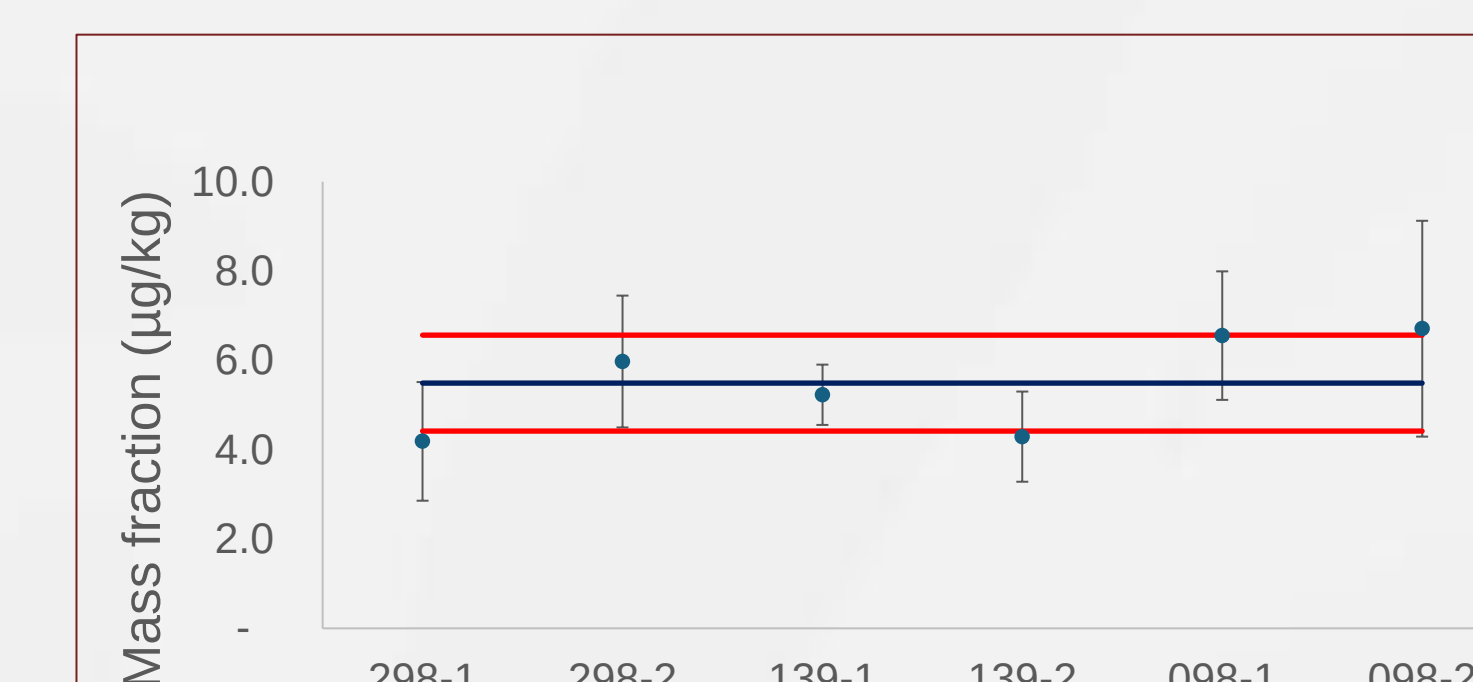
Malation monitoring



Monocrotophos monitoring



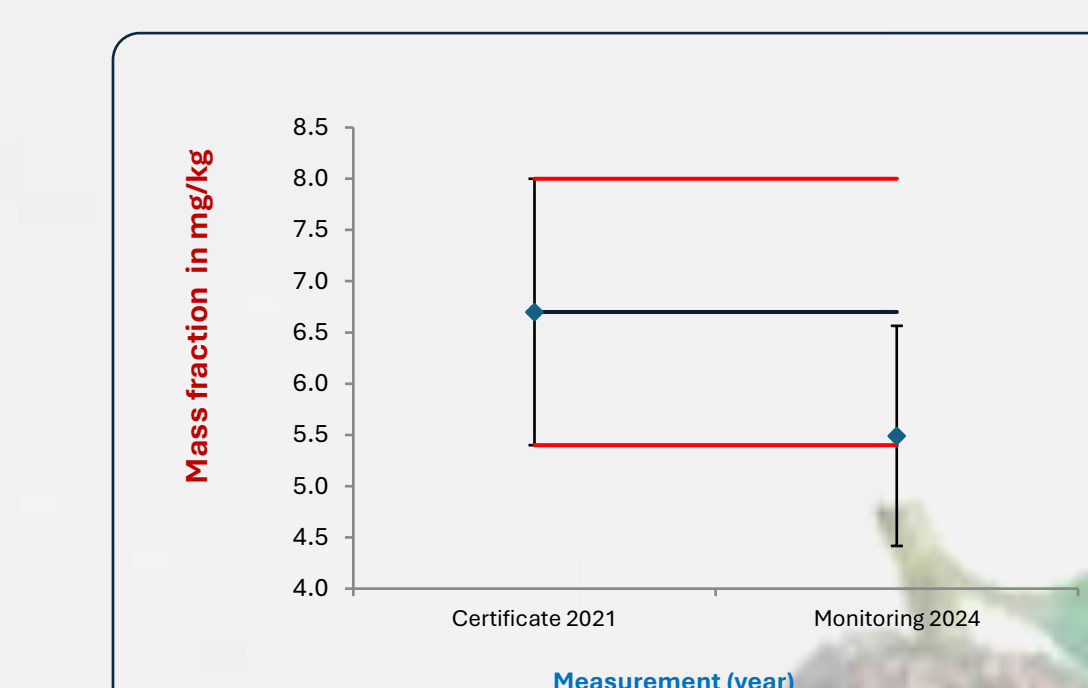
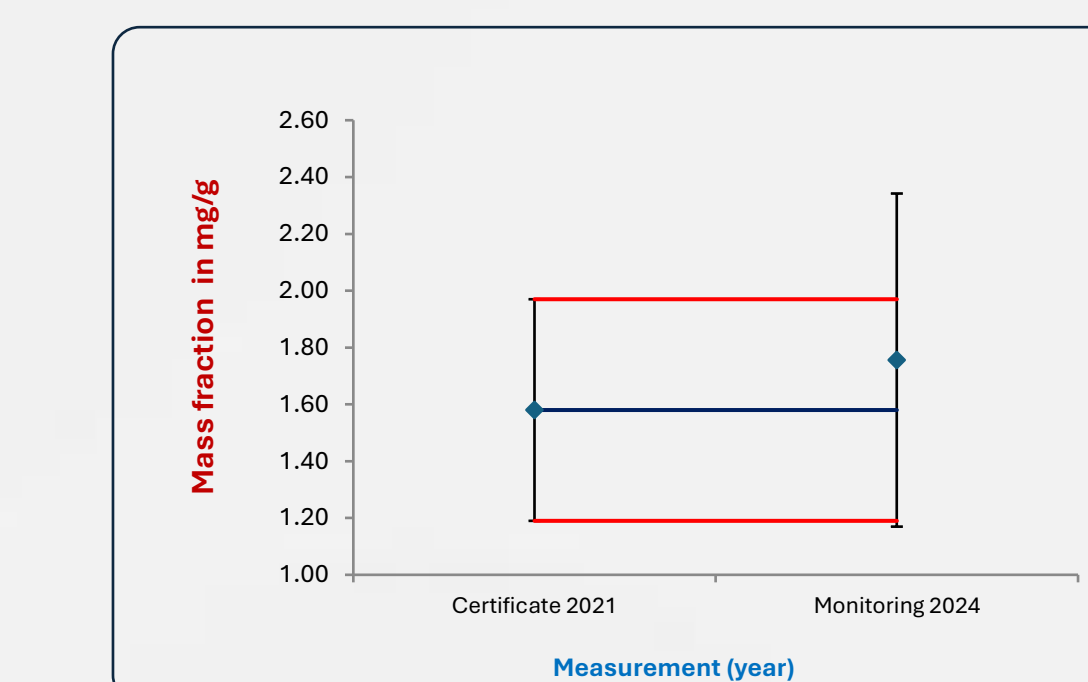
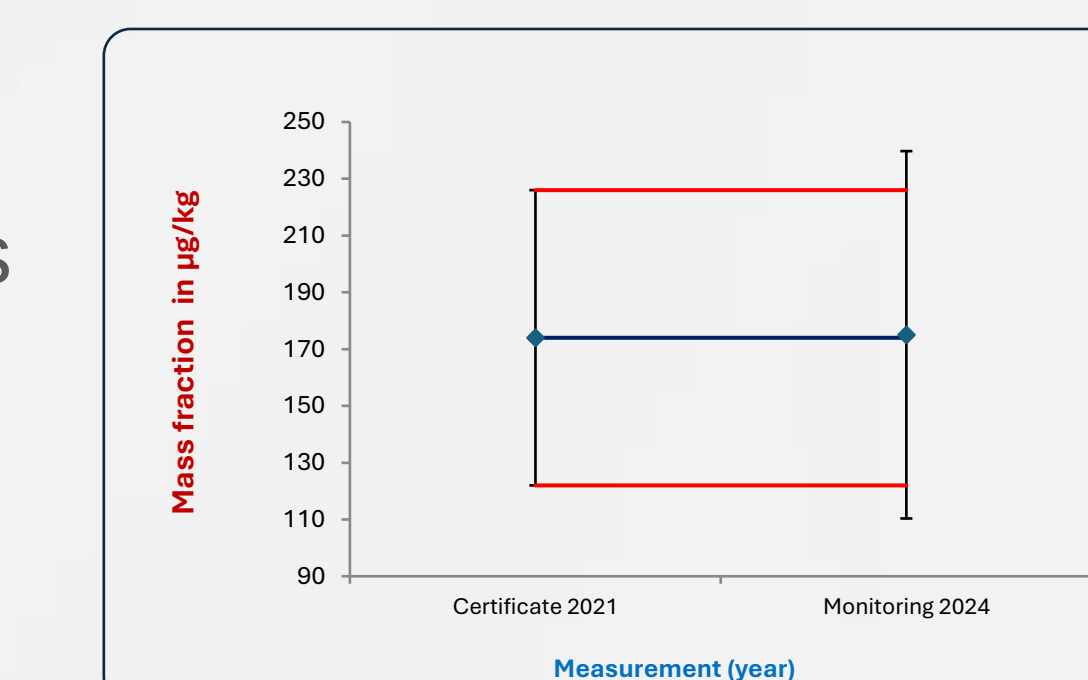
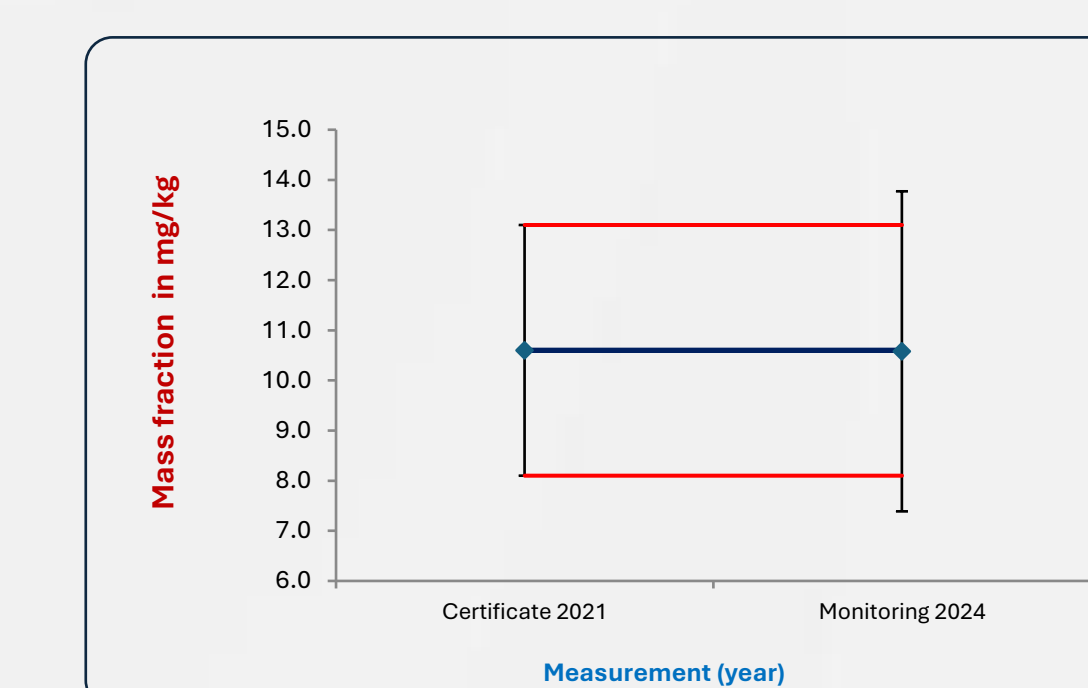
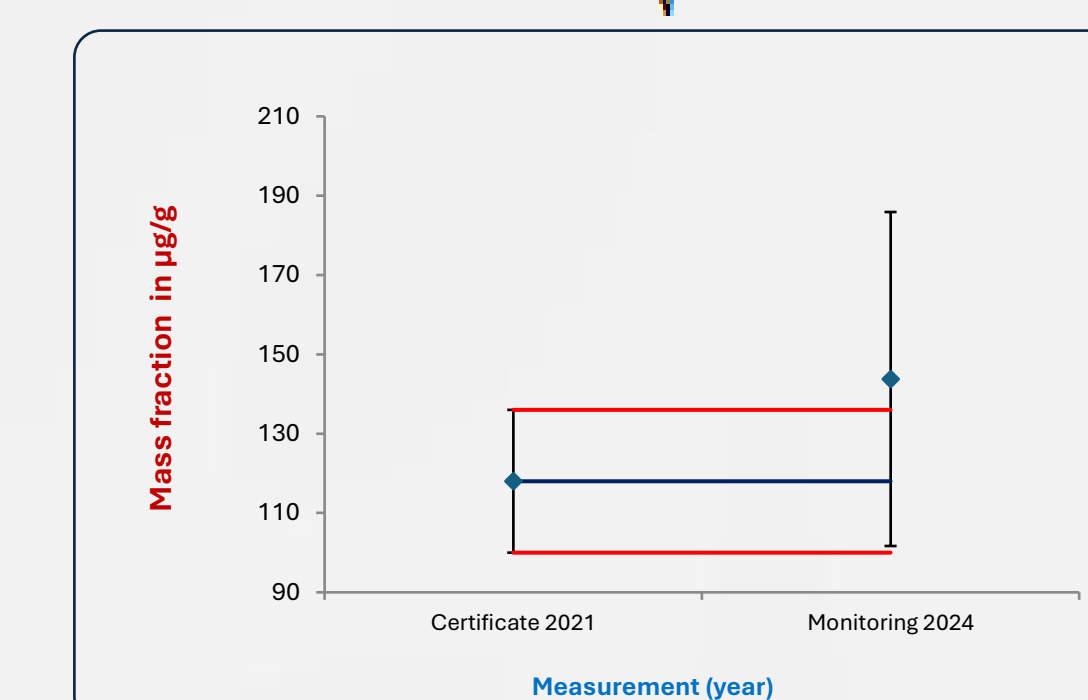
λ-cyhalothrin monitoring



Trans-permethrin monitoring

Comparison criteria

$$|w_a - w_{MRC}| \leq k \cdot \sqrt{u_{wa}^2 + u_{wMRC}^2}$$



Conclusion

When the certification was carried out, an uncertainty was assigned due to instability. When monitoring, the value of methamidophos would apparently have a greater uncertainty. However, according to the evaluation criteria established in ISO 35, the values measured in this monitoring are comparable with the assigned values, so it is concluded that it remains stable in accordance with its purpose of use, which is for proficiency testing.

References

- [1] AOAC. (2012). Official Methods of Analysis of AOAC international 19th ed. Arlington,
- [2] 630-AC-P.163; Cuantificación de compuestos orgánicos, utilizando la calibración analítica en su modelo lineal al utilizar técnicas cromatográficas
- [3] 630-AC-P.043; Determinación cuantitativa y estimación de incertidumbre de compuestos orgánicos por dilución isotópica