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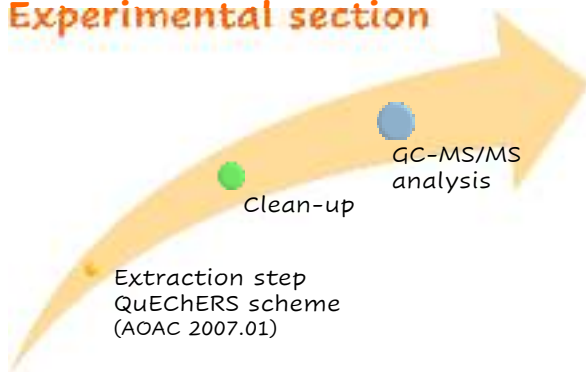
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Introduction



Onion is one of the most consumed vegetables all over the world, and Uruguay is not the exception. As a part of a global study of the pesticide intake of the Uruguayan population, we present the results of the evaluation of pesticide residues content in three onion varieties marketed in Montevideo. Samples of spring onion (*Allium fistulosum*), white and red onion (*Allium cepa*) were analyzed for 57 pesticide residues through gas chromatography coupled to tandem mass spectrometry. The compounds studied included the pesticides approved to be applied to onion plus the banned organochlorines. As onion is a bulb, the food contamination by non-approved and no longer used organochlorines cannot be dismissed because they are very persistent compounds that are still found in soils of old farms, where horticultural activities have been carried out for decades.

Experimental section



EXTRACTION STEP

- Onion (10g)
- MeCN 1% HAC
- AcONA + MgSO₄

PURIFICATION STEP

- d-SPE
- PSA + MgSO₄

INSTRUMENTAL STEP

- GC-MS/MS
- SHIMADZU TQ8050
- MRM acquisition mode

THREE ONION VARIETIES

- White onion } *Allium cepa*
- Red onion } *Allium cepa*
- Spring onion } *Allium fistulosum*

SCOPE SELECTION

COPs

- Aldrin/Endrin/Dieldrin
- Hexachlorobenzene
- DDT; DDE; DDD
- HCH (α; β; γ; δ)

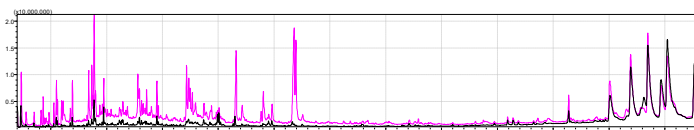
Phytosanitary package

- OP
- Py
- Ne
- Strobilurins

57 analytes

Results and discussion

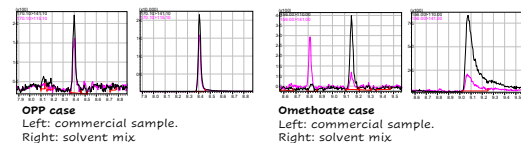
Q3 Scan → onion extract profiles



In black → White onion extract
In Pink → Red onion

The co-extractives profile is similar, but they are considerably more intense in red onion.

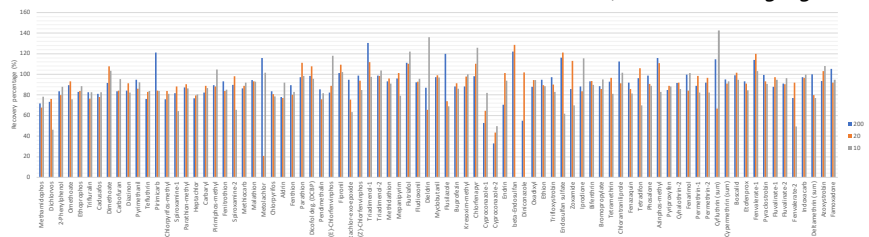
Findings in commercial samples



The analyzed samples contained also chlorpyrifos and azoxystrobin, and one of them also contained procymidone.
All of them below the Codex Alimentarius MRLs.
No organochlorines were detected in the samples.
Surprisingly the declared "organic" sample contained low levels of chlorpyrifos.

Recovery tests

Recovery test were conducted at three different concentrations: 10; 20 and 200 ug/kg.



For the three onion varieties, the results were between 70-120%

Validation summary...

Matrix effect

- ME was medium-high for the most of compounds
- Analytes showed enhanced signal (80%)

Linearity

- Analytes showed linearity range between 5-250 ug/kg
- Residuales and BCC were <20%

LOQ

- LOQ were 10 ug/kg for 90% of the analytes
- **PRECISION**
- RSDr and RSDwr was below 20%

CONCLUSIONS AND PERSPECTIVES

- The method was validated according to 2019 DG-SANTE guidelines.
- The method is currently used for monitoring purposes in its three varieties, although it focuses on *Allium cepa*.
- Positives have been detected in commercial samples even in organic samples, highlighting the need of these monitoring studies for risk assessment evaluations.

