

VALIDATION, ACCREDITATION, MONITORING AND RISK ASSESSMENT OF PESTICIDE RESIDUES IN FOODS FROM EASTERN ANTIOQUIA

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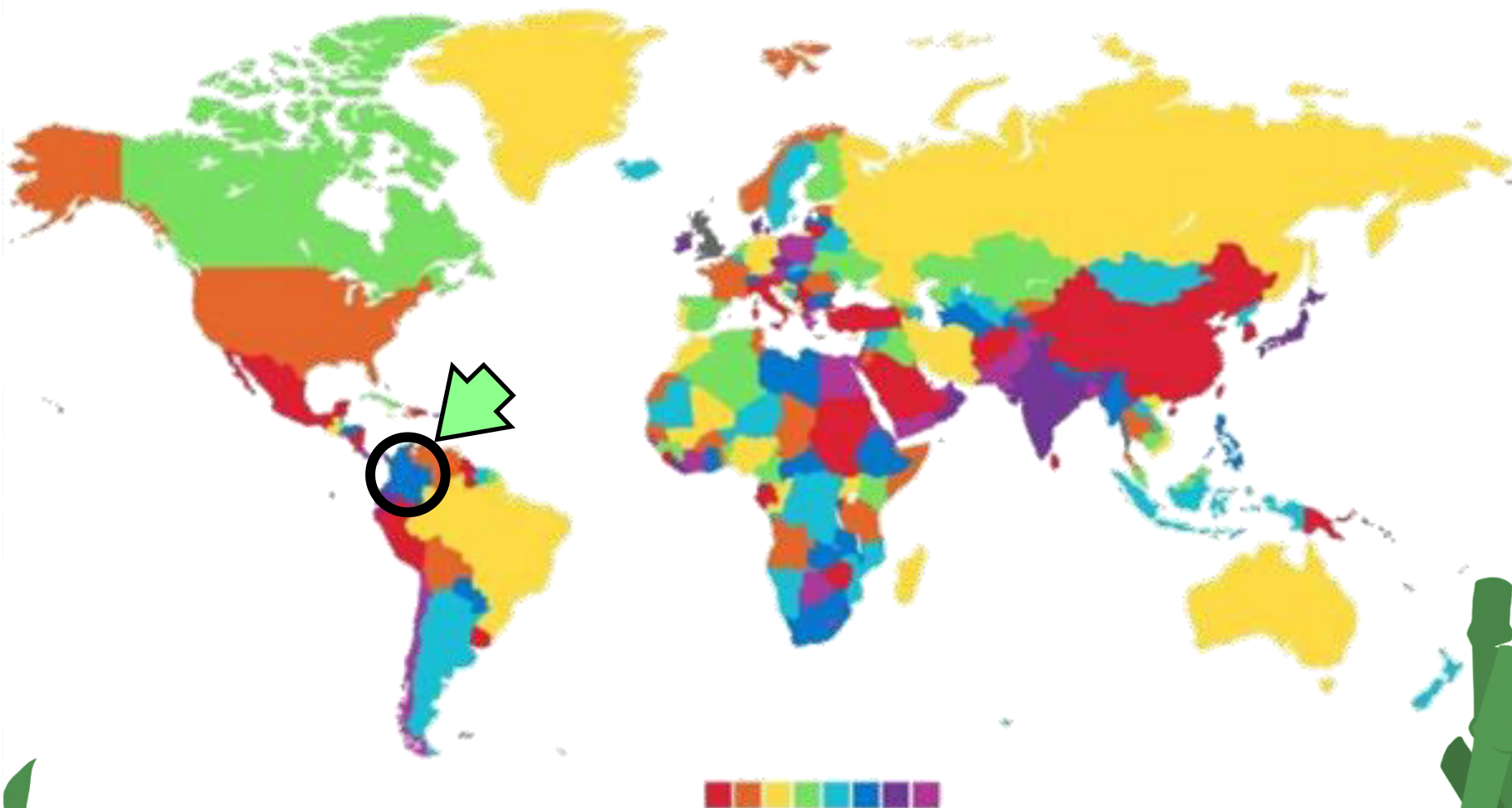
INDEX

- 1 CONTEXT
- 2 METHODS & MATERIALS
- 3 RESULTS & DISCUSSION
- 4 CONCLUDING REMARKS
- 5 WHAT'S NEXT?
- 6 BIBLIOGRAPHY
- 7 ACKNOWLEDGEMENTS



CONTEXT

1.1.0 COLOMBIA



<https://www.muralesyvinilos.com/fotomurales/mapas/mapamundi-colores>

1.2.0 COLOMBIAN PRODUCTS



OIL
COAL
GOLD
EMERALDS
FLOWERS
COFFEE
FOODS

www.colombiatrade.com.co

www.colombia.travel

1.3.0 REGULATIONS



MinSalud

Ministerio de Salud
y Protección Social

To update this resolution, Agriculture Ministry and Social Protection Ministry will do a yearly update of the MRLs according to Codex Alimentarius.



C O D E X
International Food Standards
A L I M E N T A R I U S

Por la cual se establecen los Límites Máximos de Residuos de Pesticidas - LMR- en alimentos para consumo humano y en piensos o forrajes

1.4.0 PROBLEM



Does Colombia has knowledge, equipment and know-how available to survey the presence of pesticide residues in foods according to Resolution 2906 of 2007?

How do we combine all our capabilities to improve them and demonstrate the validity of our monitoring results?

Will the information gathered allow the further issue of new and suitable MRLs in our country?

1.5.0 JUSTIFICATION



PRACTICAL



METHOD



REGULATORY

METHODS & MATERIALS



2.1.0 VALIDATION



**International
Standards
Organization**

ISO/IEC 17025:2005

«Confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled».

2.1.1 IMPLICATIONS

VALIDATION



AOAC 2007.01



Guide CG 4



ISO/IEC 17025



EN 15662



12571/2013



R-AC-01

2.1.2 CRITERIA

VALIDATION

Parameter	What/how	Criterion	Cross reference to AQC document
Linearity	Calibration curve	Residuals < $\pm 20\%$	C14-C18
Matrix effect	Comparison of response from solvent standards and matrix-matched standards	Assess % matrix effect	C22-C24
LOQ	Lowest spike level meeting the method performance criteria for trueness and precision	\leq MRL	G2-G5
Specificity	Response in reagent blank and blank control samples	< 30% of RL	H5
Trueness (bias)	Average recovery for spike levels tested	70-120%	C45
Precision (RSD _r)	Repeatability RSD _r for spike levels tested	$\leq 20\%$	E14,G6
Precision (RSD _{wr})	Within-laboratory reproducibility, derived from on-going method validation / verification	$\leq 20\%$	
Robustness	Average recovery and RSD _{wr} , derived from on-going method validation / verification	See above	G2, G4

SANCO/12571/2013

2.2.0 FOODS



Sugarcane
Saccharum officinarum



Lettuce
Lactuca sativa



Potato
Solanum tuberosum



Goldenberry
Physalis peruviana



Tomato
Solanum lycopersicum



Tamarillo
Solanum betaceum

II. add 10 mL acetonitrile



III. add ISTD-solution



IV. shake ~ 1 min



V. add
4g MgSO₄,
1g NaCl,
1g Na₂Citrat x 2H₂O
0.5g Na₂HCitrat
Sesquihydrate



VI. shake ~ 1min



I. weigh 10g of sample homogenate

Advantages:

- **Quick** (~30 min/batch of 6 samples)
- **Easy** (no laborious steps)
- **Cheap**
- **Effective** (wide scope, low consumption)
- **Rugged** (minimal sources of errors)
- **Safe**



VII. Centrifuge 5 min/~3000 g

GC/LC



30 min

Extract in acetonitrile
→ amenable to GC-, LC- and (D)-SPE

www.quechers.com

XIII. adjust pH with HCOOH



XII. take aliquot



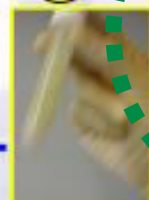
VIII. take aliquot...



IX. d-SPE with MgSO₄ + PSA (+GCB or ODS)



XI. centrifuge 3 min /~3000 g



X. shake ~ 30 sec

Courtesy of M. Anastassiades

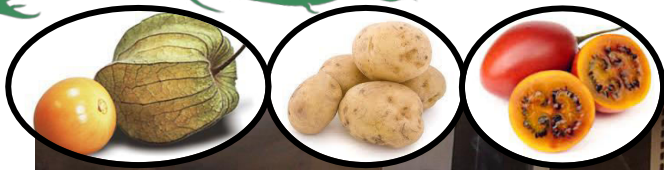
Courtesy of M. Anastassiades, CVUA Stuttgart, Germany

2.3.0 GDCON

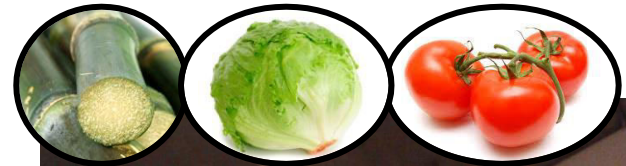


<https://www.museodeantioquia.co/noticia/jornadas-para-reflexionar-el-centro-de-medellin/>

2.4.0 INSTRUMENTS



GC Agilent Technologies 7890A
VL MSD Agilent Technologies 5975C



Aquity UPLC H Class
XEVO TQD Waters

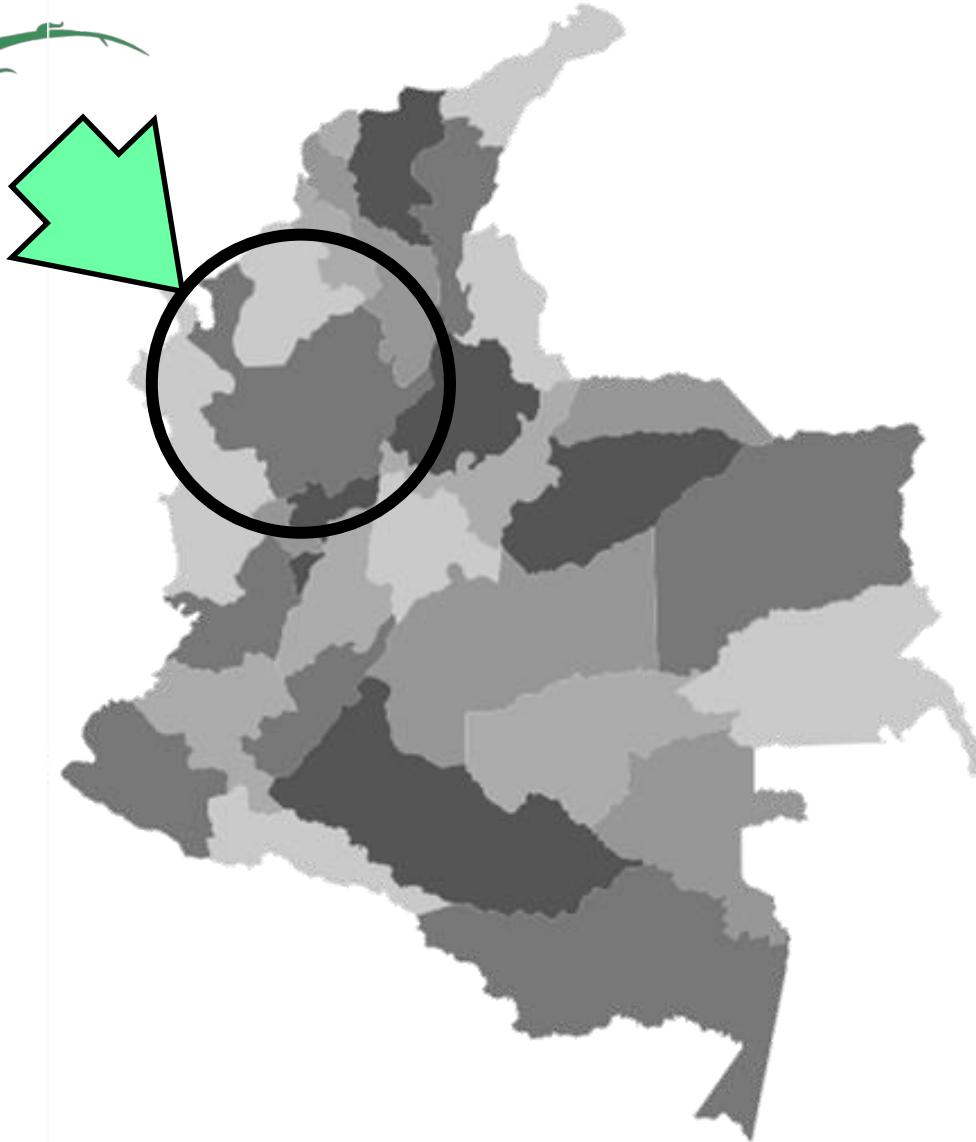


2.5.0 RISK



2.5.1 SURVEY

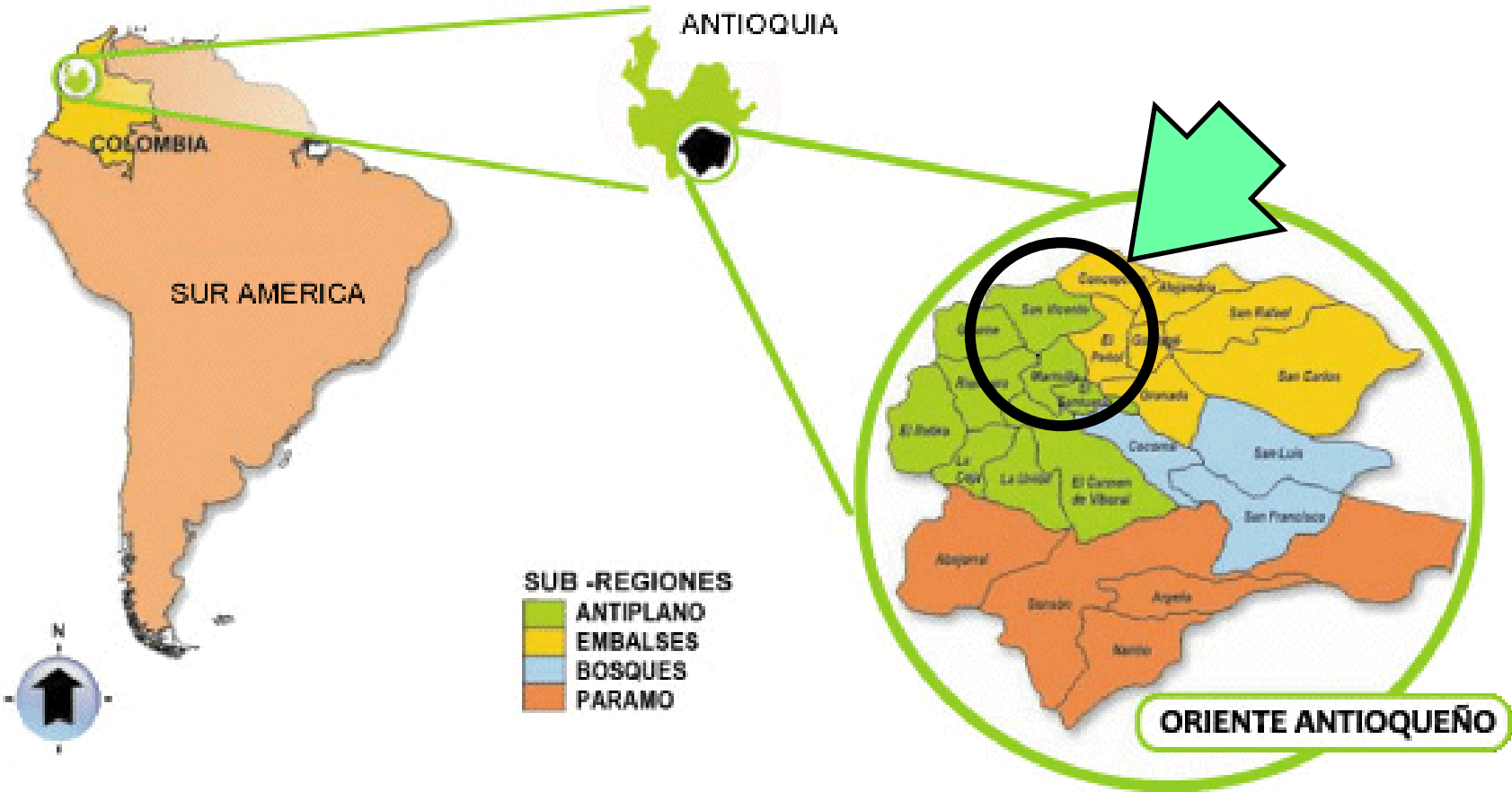
RISK



<http://www.uxabilidad.com/recursos/mapa-politico-de-colombia-en-vectores.html>

2.5.1 SURVEY

RISK

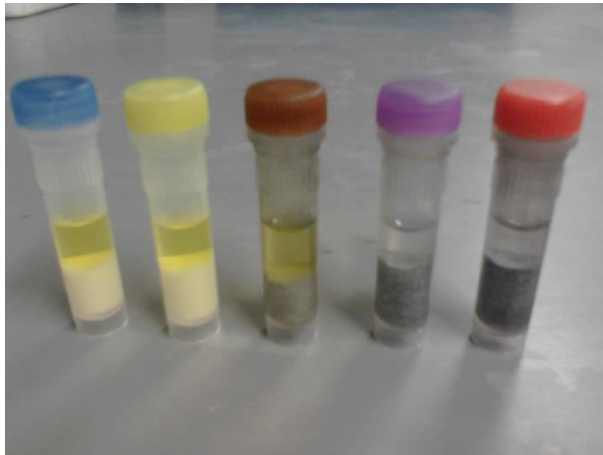
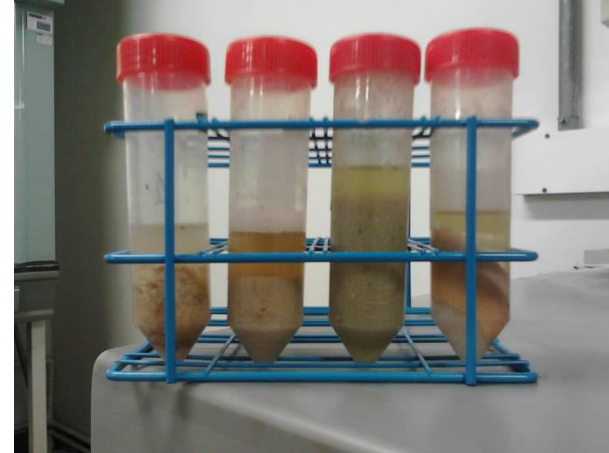


<http://pharus.webnode.es/turismo-sostenible/>

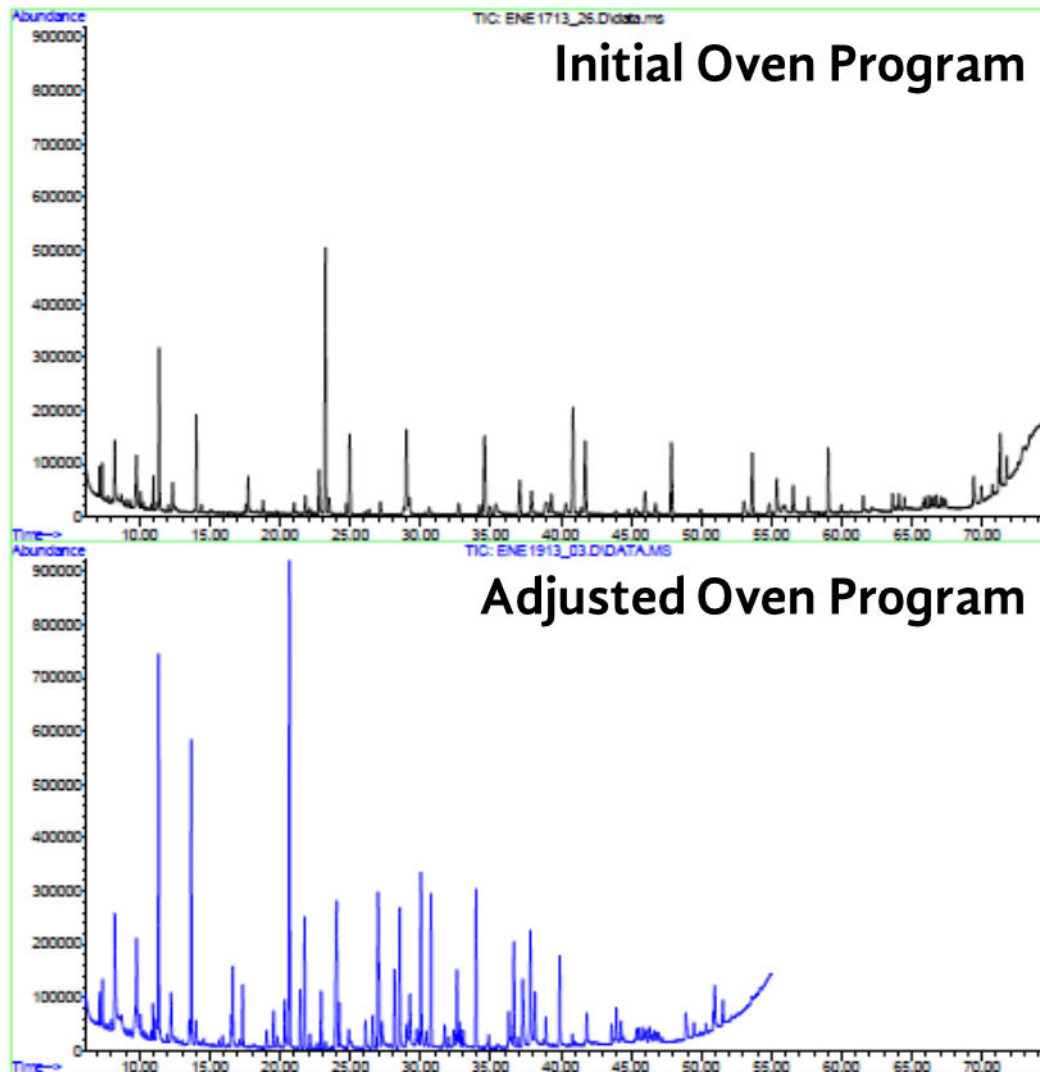
RESULTS & DISCUSSION

The background features a repeating pattern of stylized illustrations of tomatoes and eggplants. The tomatoes are depicted in various stages, including whole, sliced, and broken open to show seeds. The eggplants are shown as whole, sliced, and broken open. The illustrations are rendered in a light teal color, with some elements appearing as darker teal or black outlines. The overall style is clean and modern, with a focus on the natural forms of the vegetables.

3.1.0 EXTRACTS

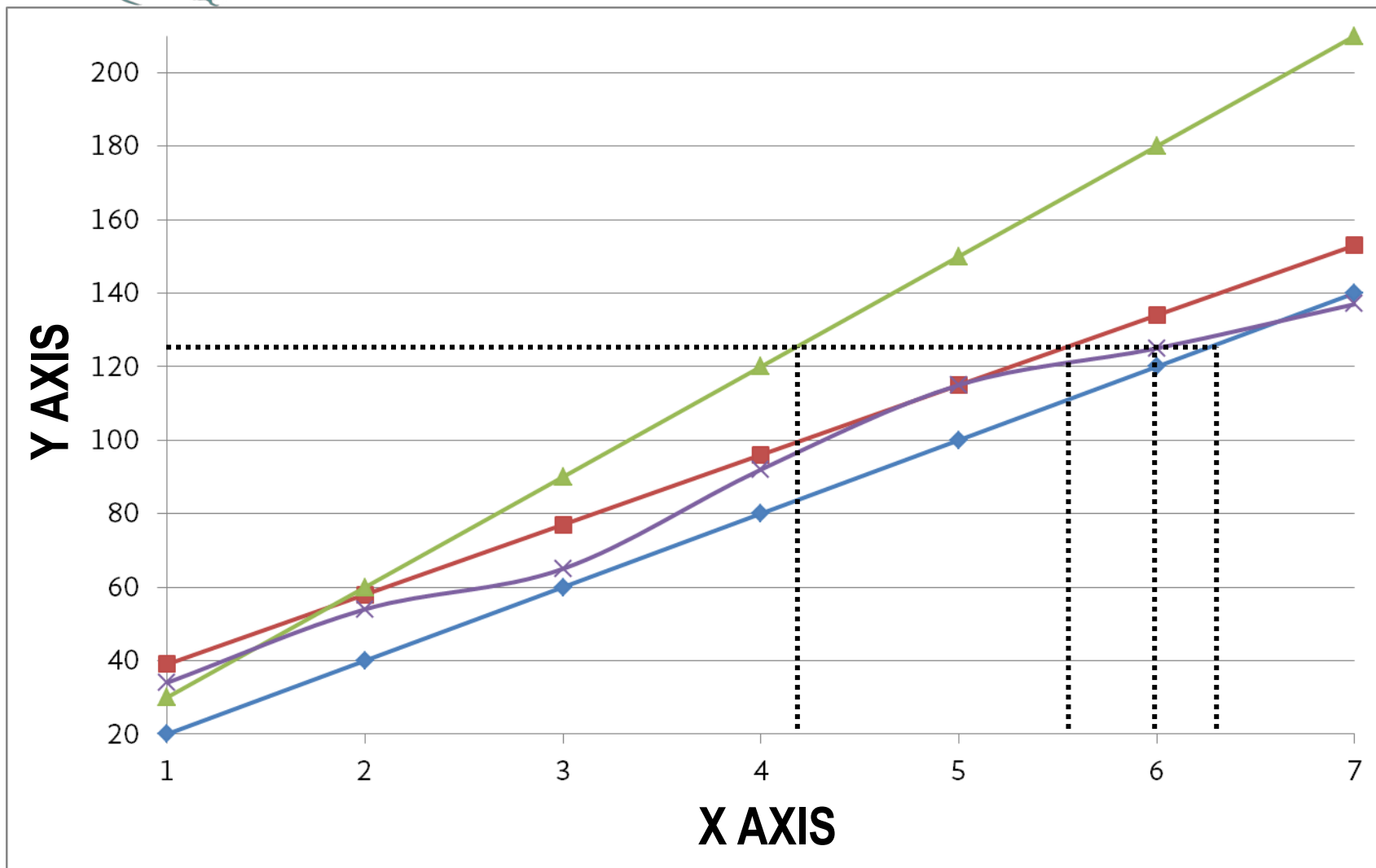


3.2.1 SELECTIVITY EVIDENCE



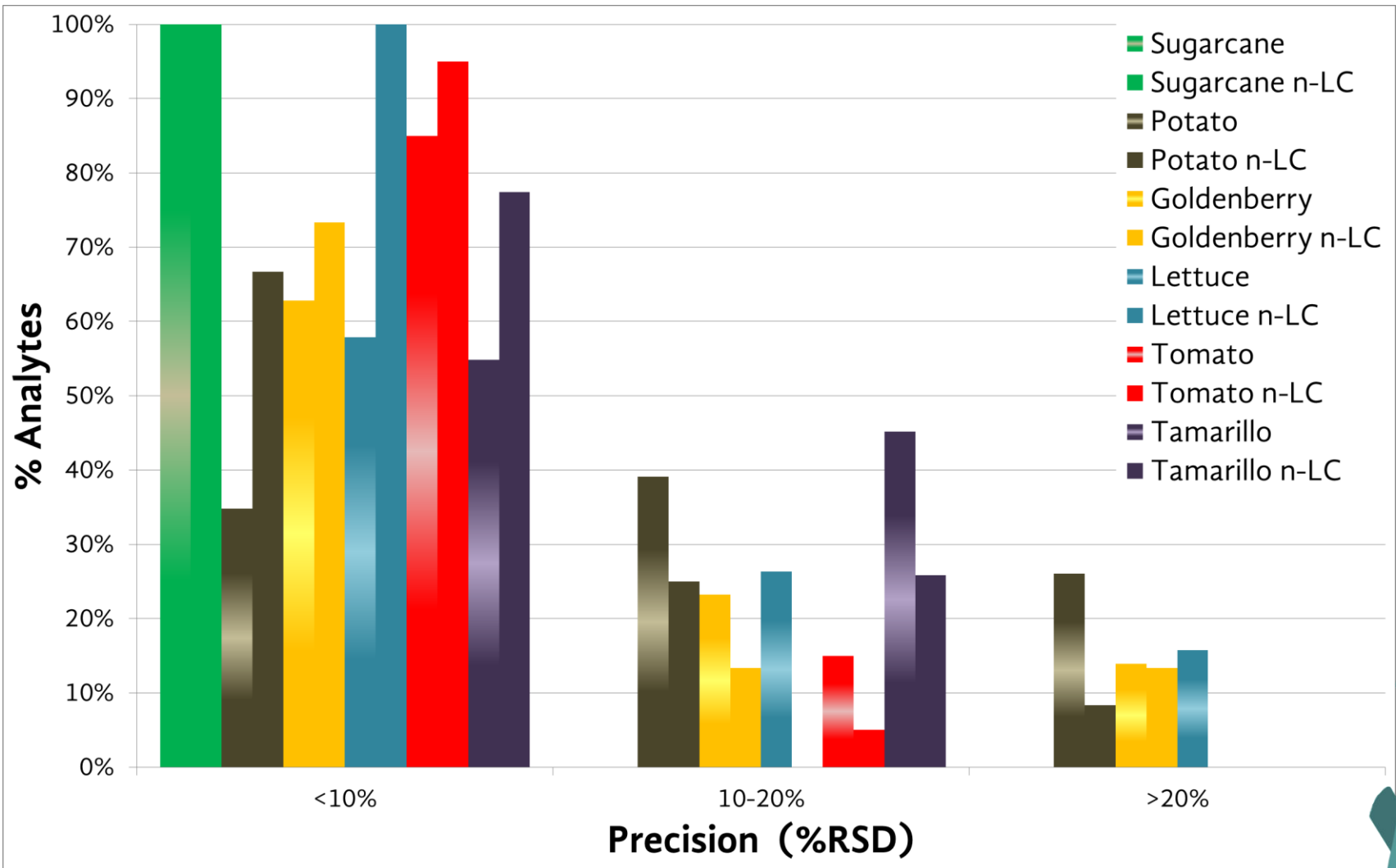
3.2.2 MATRIX EFFECT

EVIDENCE



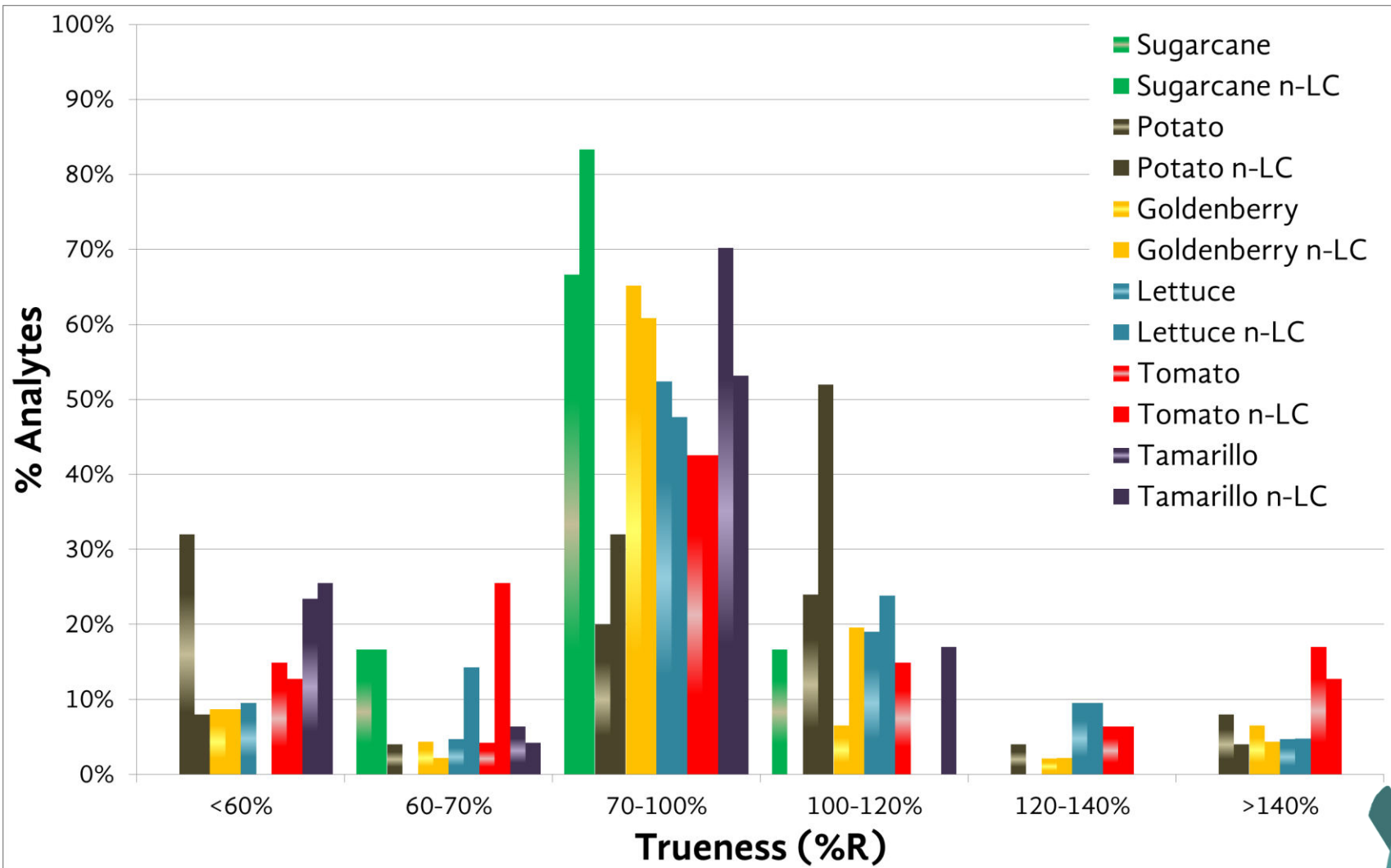
3.2.3 PRECISION

EVIDENCE

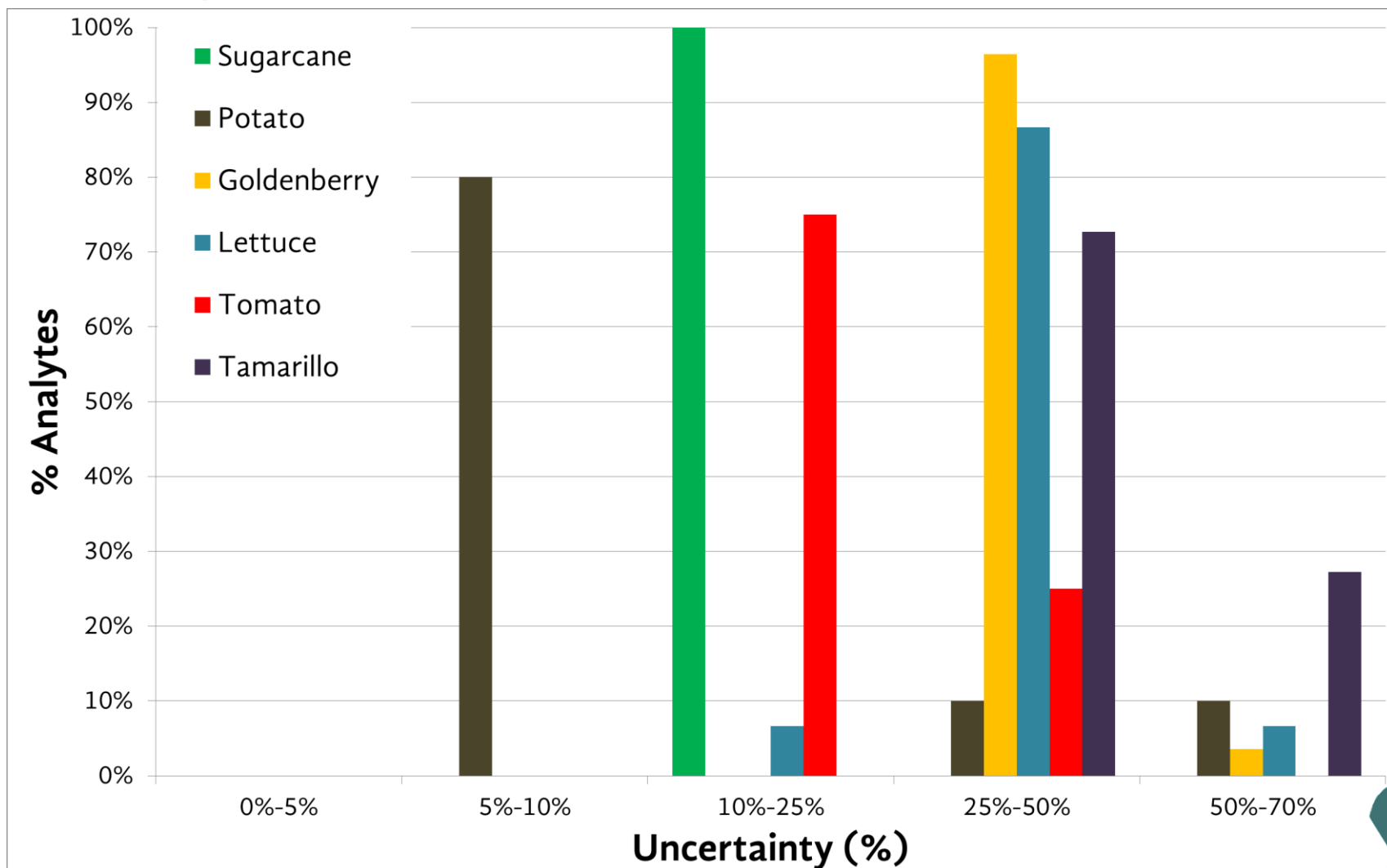


3.2.4 TRUENESS

EVIDENCE



3.2.5 UNCERTAINTY EVIDENCE



3.3.0 VALIDATION SUMMARY

Food	Resolution 2906	Compatible Analytes		Detectable Analytes		Valid Analytes	
		#	% Total (%)	#	% Total (%)	#	% Total (%)
Potato	61	51	83,6	25	41,0	10	16,4
Goldenberry	64	55	85,9	46	71,9	28	43,8
Tamarillo	64	55	85,9	46	71,9	33	51,6
Tomato	64	62	96,9	52	81,3	24	37,5
Lettuce	29	25	86,2	21	72,4	15	51,7
Sugarcane	8	7	87,5	6	75,0	5	62,5

3.4.0 RISK MAP

Food	Residue	Concentration			Regulatory Risk	Chronic Toxicity	Acute Toxicity
		(m g/kg)				Risk	Risk
Goldenberry	Fenpropatrin	0,015	0,008	0,007	0,001	0,050	0,000
Potato	Cbiphrifos	0,527	—	—	0,011	0,439	0,002
Tomato	Carbofuran	1,046	1,115	1,335	N/A	29,133	0,012
Tomato	Diazinon	0,244	0,225	0,223	0,058	N/A	N/A
Tomato	Dinetoate	0,110	0,388	0,152	N/A	135,417	0,108

N/A : information not issued or not available.

Significant chronic toxicity risk in tomatoes!

3.5.0 ACCREDITATION



13-LAB-053



*EL ORGANISMO NACIONAL DE ACREDITACIÓN DE COLOMBIA
acredita a:*

**UNIVERSIDAD DE ANTIOQUIA –
Grupo Diagnostico y Control de la Contaminación -
GDCON.**

NIT: 890.980.040-8

Calle 67 # 53-108 Medellín, Antioquia, Colombia

CONCLUDING REMARKS

The background features a collection of stylized illustrations of various vegetables and plants. These include tomatoes, eggplants, and leafy greens, rendered in different shades of blue and black. The illustrations are scattered across the white background, creating a textured and thematic backdrop for the text.

4.0.0 CONCLUDING REMARKS

By means of QuEChERS and chromatographic techniques (GC-MS and UPLC-MS/MS) it was possible to provide objective evidence of the fulfillment of the requirements.

There is a gap between local and international know-how. Its causes should be found and attended to improve Colombian installed capacity.

The survey suggests that risks from pesticides should be attended.





WHAT'S NEXT?

5.0.0 WHAT'S NEXT?



More pesticides, more foods, more risk assessment.

National scale survey.

Update Colombian Resolution.



BIBLIOGRAPHY

6.0.0 BIBLIOGRAPHY



x37
Anastassiades,
Lehotay, *et al.*



x20



x20
EURLs Datapool



x19
ISO
Res. 2906



ACKNOWLEDGEMENTS

7.0.0 ACKNOWLEDGEMENTS



1803



GRUPO DIAGNÓSTICO Y CONTROL DE LA CONTAMINACIÓN

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**THANK YOU FOR YOUR
KIND ATTENTION**

**¡MUCHAS GRACIAS POR SU
ATENCIÓN!**