



Mass Spectrometry testing for contamination in Food & Beverage using Qtrap™ Technology

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Eurofins Meeting

Agenda

- AB portfolio
- QTrap Technology
- Application in food analysis.

triple quadrupole portfolio



API 2000 ®



API 3200 ®



API 4000 ®



API 5000 ®

QTrap portfolio

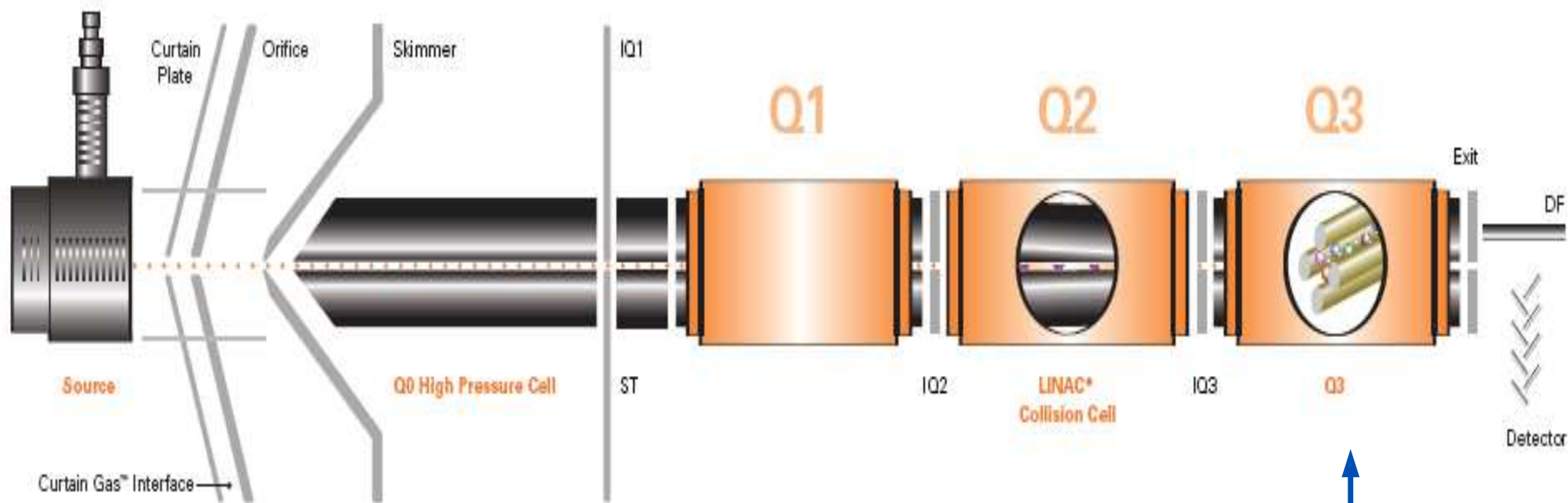


API 3200 Q TRAP ®



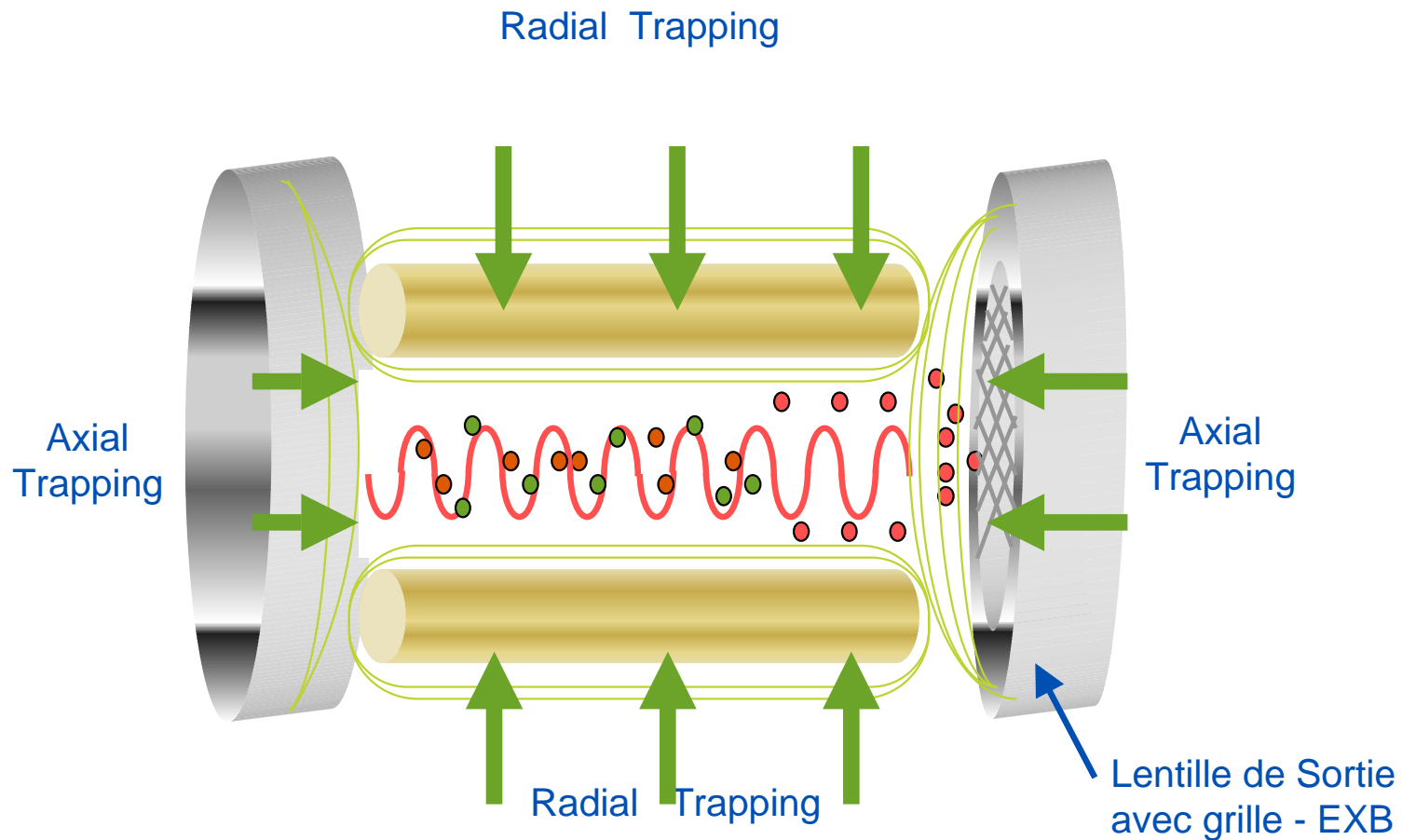
API 4000 Q TRAP ®

Triple Quadrupôle / Linear Ion Trap QTRAP®



↑
*Linear Ion Trap
3x10⁻⁵ Torr*

Ion Trap - QTRAP®

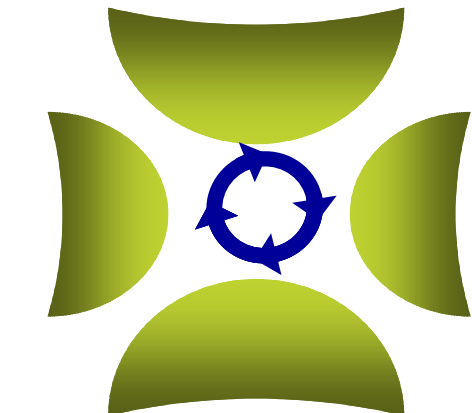


QTRAP[®] Features

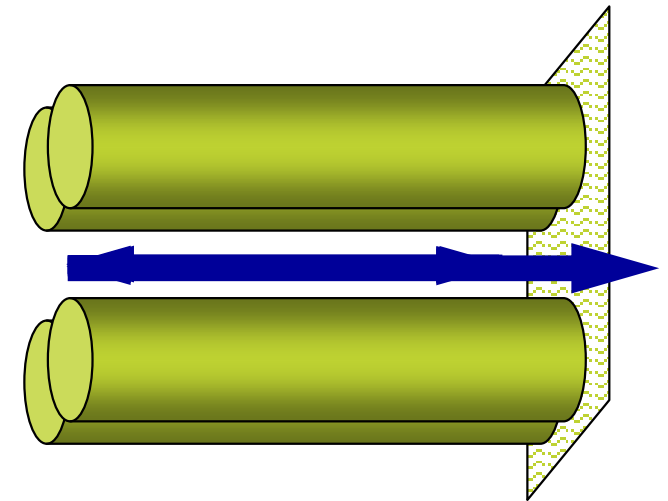
3D Traps

Full Scan Sensitivity

MS³ (more)



QTRAP[®] technology



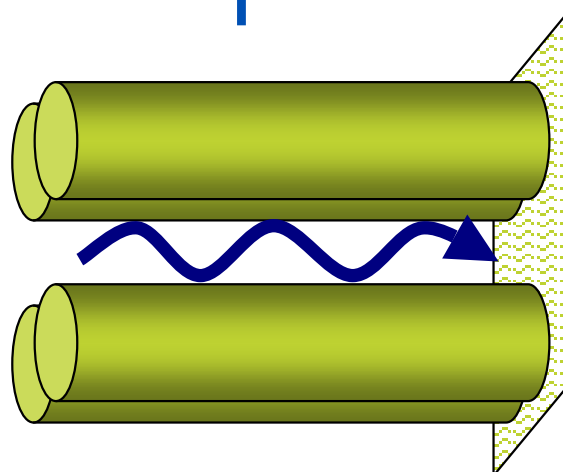
Triple Quad.

MRM Sensitivity

→ Quantitation

Neutral Loss

Precursor Ion Scan



Full Scan Sensitivity → Screening

MS³ → Structural analysis

MRM Sensitivity → Quantitation

Neutral Loss

Precursor Ion Scan

+ New scan modes

Applications

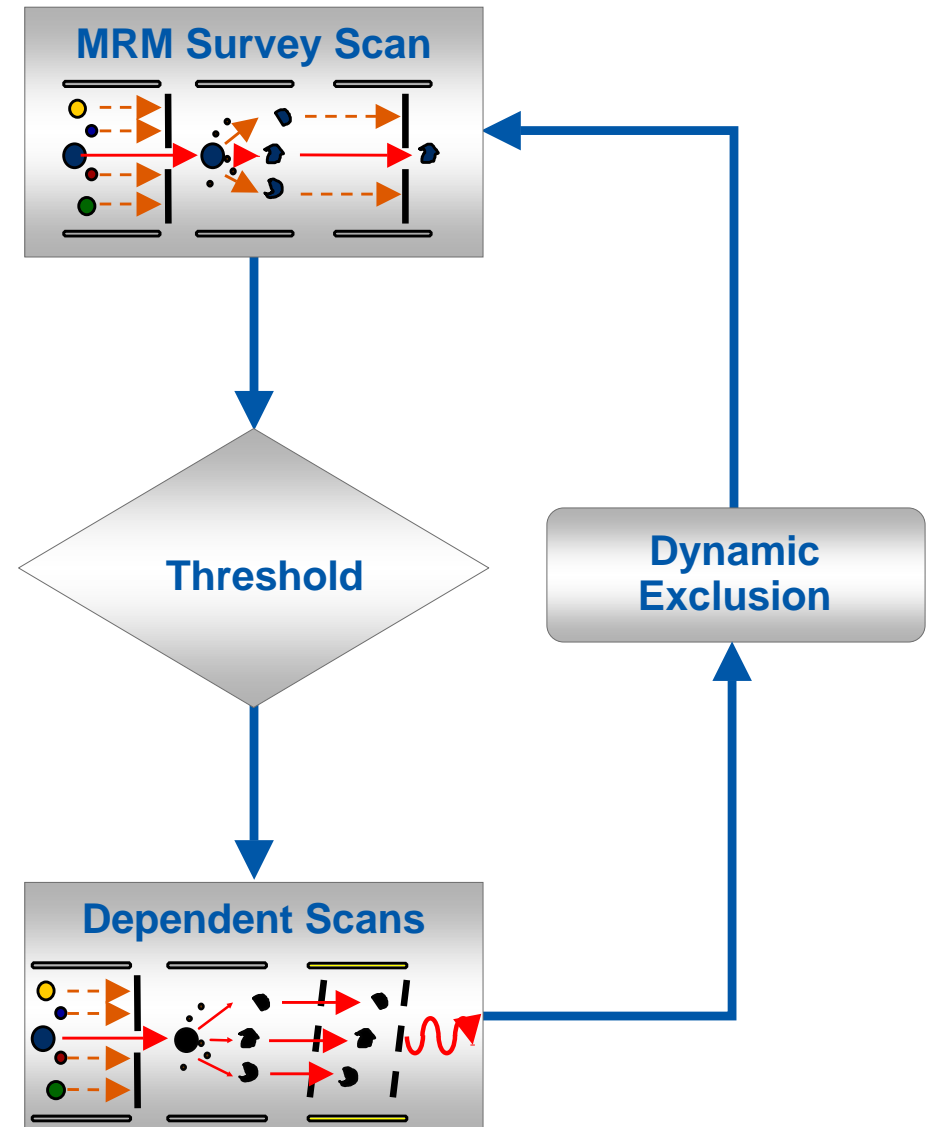
- ✓ Pesticide screening in fruits and vegetables
- ✓ Mycotoxins analysis
- ✓ Sudan dyes
- ✓ Antibiotics (nitrofurans metabolites, chloramphenicol, sulfonamides, tetracyclines...)
- ✓ Malachite green in fish samples
- ✓ Acrylamide
- ✓ BADGE (Bisphenol A diglycidyl ether)
- ✓ Food additives (Folic acid, vitamins)
- ✓

Pesticide Screening on 3200 QTRAP

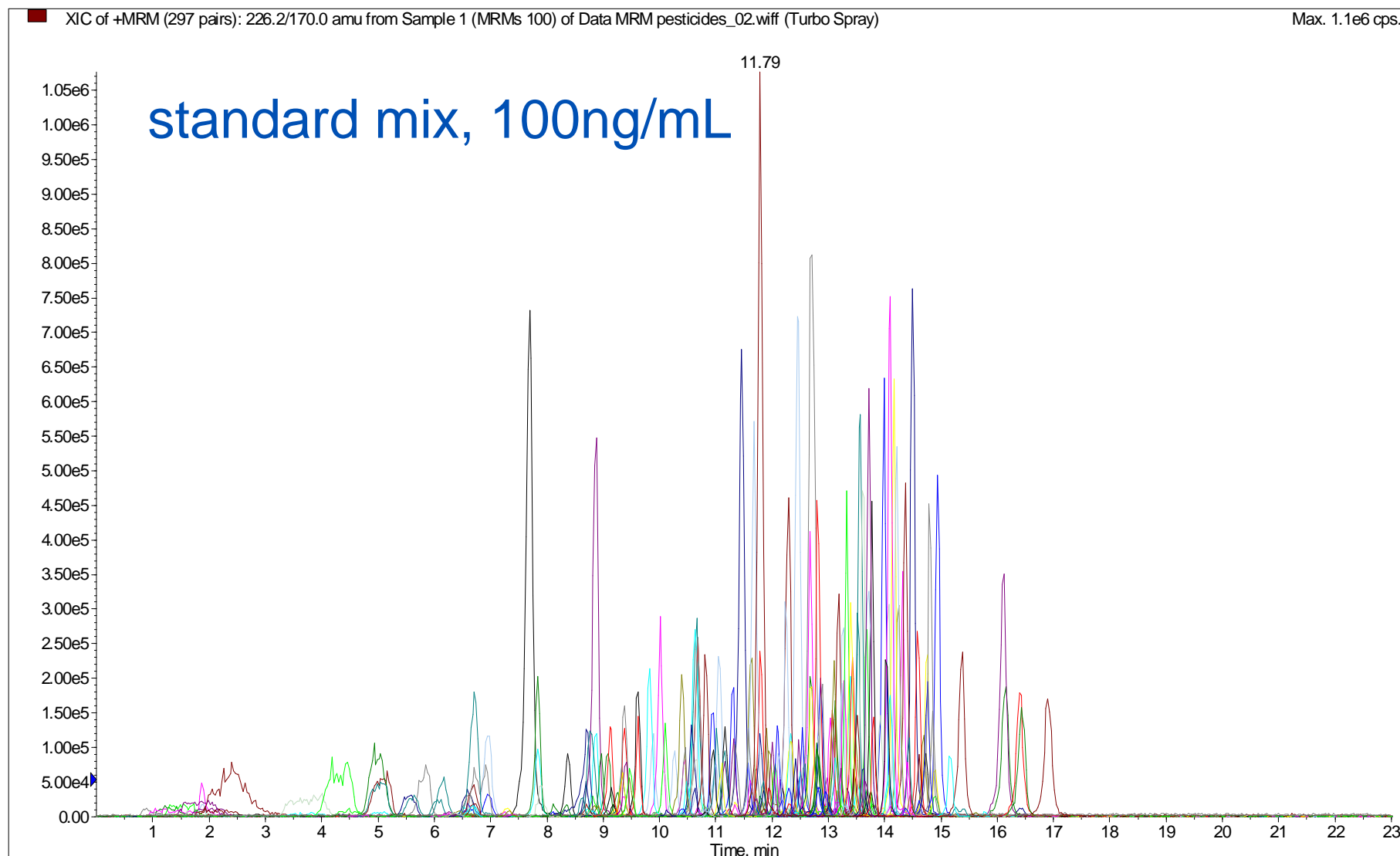
- ✓ Screening for 300 pesticides
- ✓ 1 MRM transitions to quantify
- ✓ 3 EPI spectra (20, 35, 50V) to search against a library
- ✓ Sensitivity high enough for analysis of baby food (10 μ g/kg) and food (100 μ g/kg), but not enough for drinking water 0.1 μ g/L
- ✓ Application Note in press
- ✓ Method and library are available for customers

Acquisition method

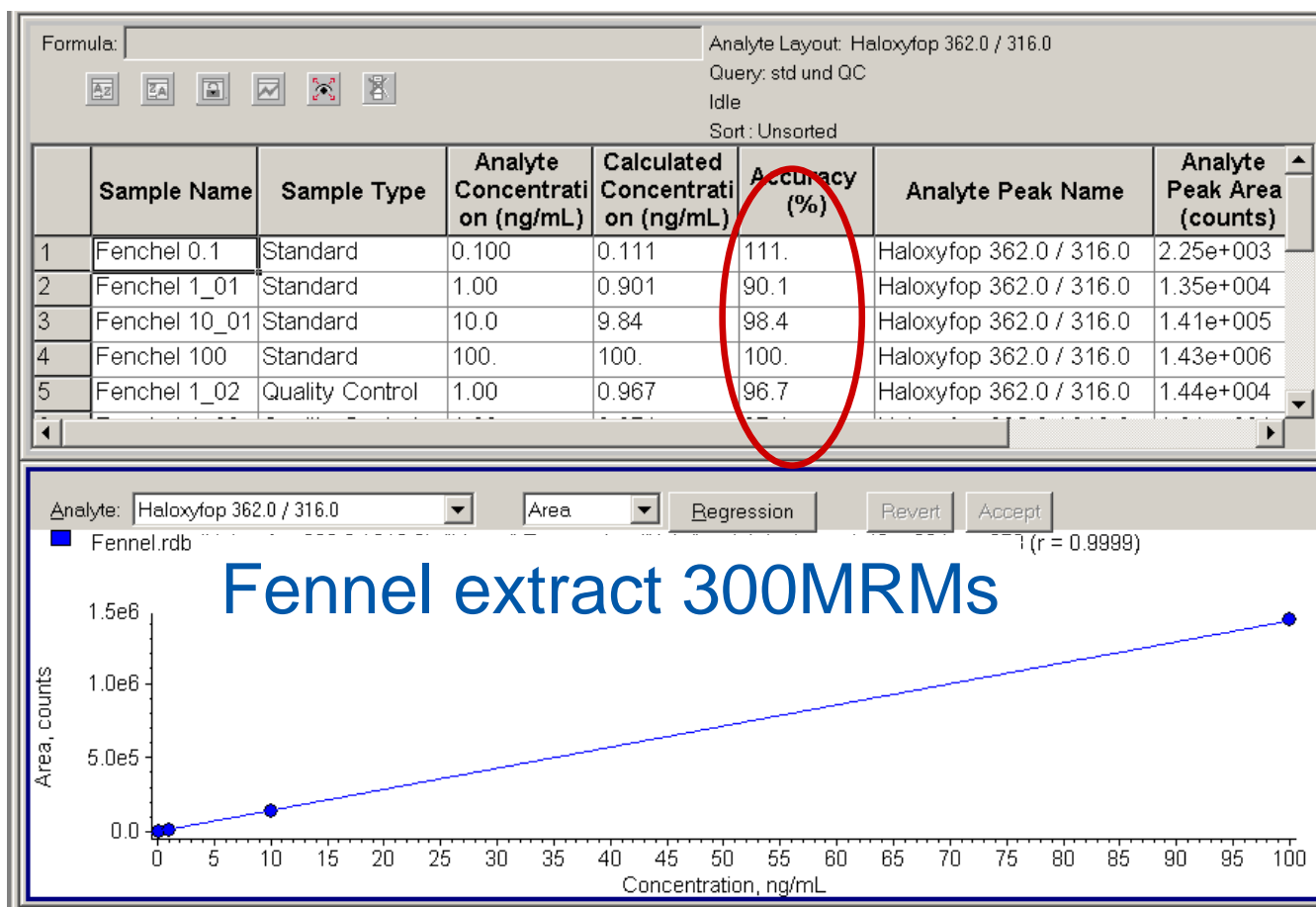
- Survey scan in MRM (300 pesticides)
- Intensity threshold of 500cps
- Automatically triggered Enhanced Product Ion Scans (three different collision energies)
- Dynamic background subtraction using 3 spectra



300 pesticides in MRM (5msec)

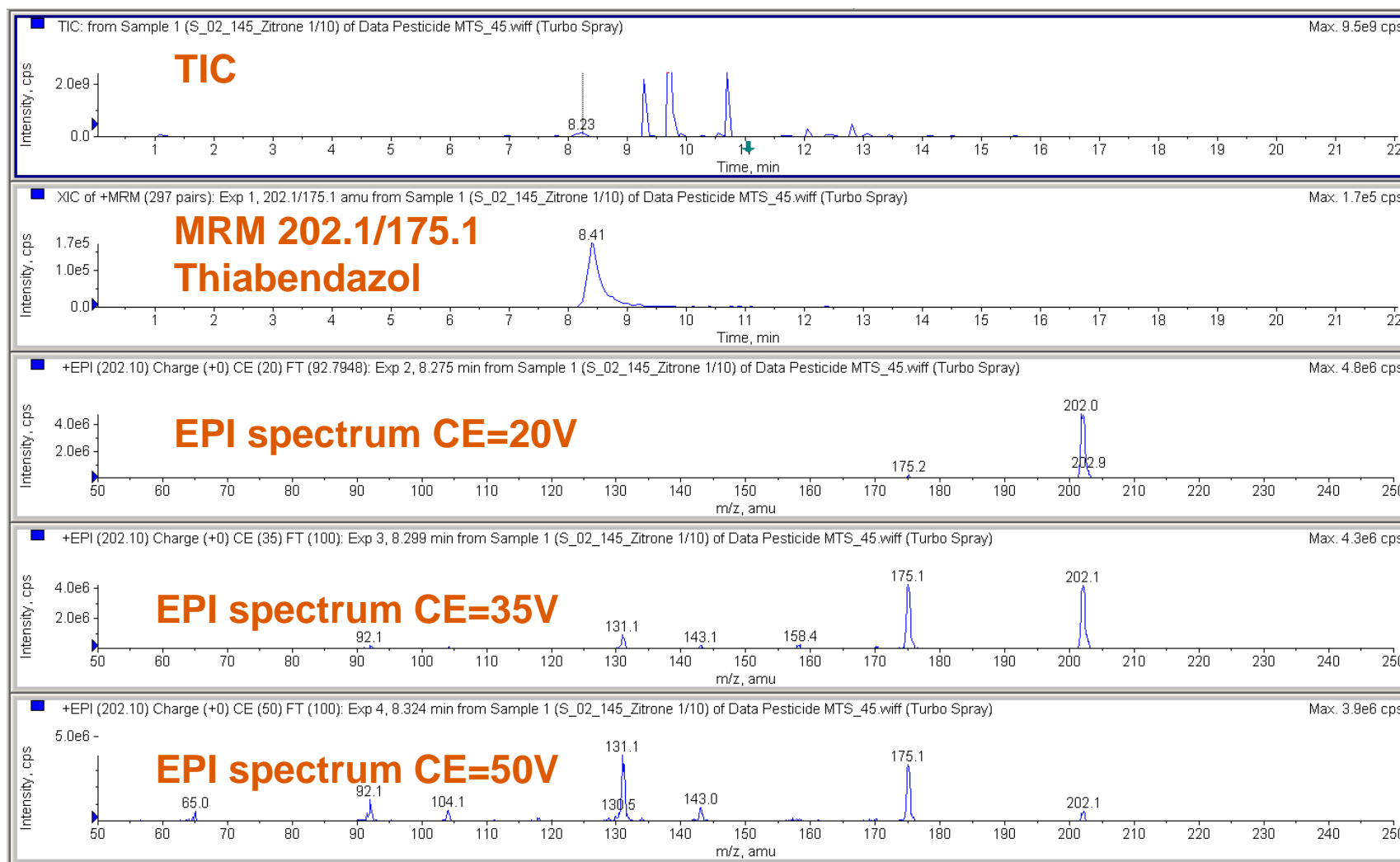


Haloxifop in Funnel



Expected Concentration	Sample Name	Number Of Values Use	Mean	Standard Deviation	%CV	Accuracy
1.000000	Fenchel 1_02,	5 of 5	0.971351	0.072304	7.443627	97.135092
10.000000	Fenchel 10_02,	5 of 5	10.030596	0.077273	0.770372	100.305960

Extract of lemon



Summary

- Quantification of 300 compounds in Multiple Reaction Monitoring (MRM) by using LINAC collision cell
- Confirmation using Enhanced product ion scan and mass spectral library
- Confirmation of the quantifier using the library searching of MS/MS spectra
- High robustness due to ion source and interface design

Mycotoxins

- ✓ Mycotoxins are secondary metabolites produced by various molds (for instance fusarium species)
- ✓ Fumonisin, Deoxynivalenol, Trichothecene, Zearalenon, Ochratoxin A, Aflatoxins, Patulin
- ✓ IARC (International Agency for Research on Cancer) sees mycotoxins as potentially cancerogenic
- ✓ In December 2003 the Legislation for DON and ZON were defined in the EU
- ✓ So far Legislations existed only for Ochratoxin A (3 ppb) and Aflatoxin (B1 2 ppb, total 4ppb) related to wheat
- ✓ Discussions for further regulations are still continuing

Mycotoxins

- ✓ Applications available from Germany and Brazil
 - ✓ API 2000: Fusarium mycotoxins [Deoxinivalenol (DON), Nivalenol (NIV), Ochratoxin A (OTA), HT2-toxin (HT2), T2-toxin (T2) und Zearalenon (ZON)] in corn / grain and products containing them
 - ✓ LOQ = 10 ppb
 - ✓ API 4000: OTA, OTB, ZON
 - ✓ LOQ = 0.2 ng/ml
 - ✓ API 3200: Aflatoxin (B1, B2, G1, G2) and ZON in corn and cereals
 - ✓ LOQ = 0.3 ng/ml (Aflas), 0.04 ng/ml (ZON)

Conclusion

- Mass Spectrometry
 - Sensitivity
 - Specificity
 - Reduce sample preparation
- QTrap technology
 - Quantitative and qualitative analysis within a run



AB Applied Biosystems

Thank you for listening