



NEW!



LC-MS/MS ANALYSIS OF PESTICIDES in Various Matrices

Jasem® Method: Accuracy – High Speed – Simplicity in New Dimensions !

Easy Pesticide Isolation & Concentration System with LC-MS/MS

EPICS®

Method:

The **Easy Pesticide Isolation and Concentration System (EPICS®)** is a **fully automated**, two-dimensional LC-MS/MS system for the determination of up to 300 different pesticides from various commodities. For the measurement, we injected an aliquot of the acetonitrile raw extract into the system.[Fig.1]

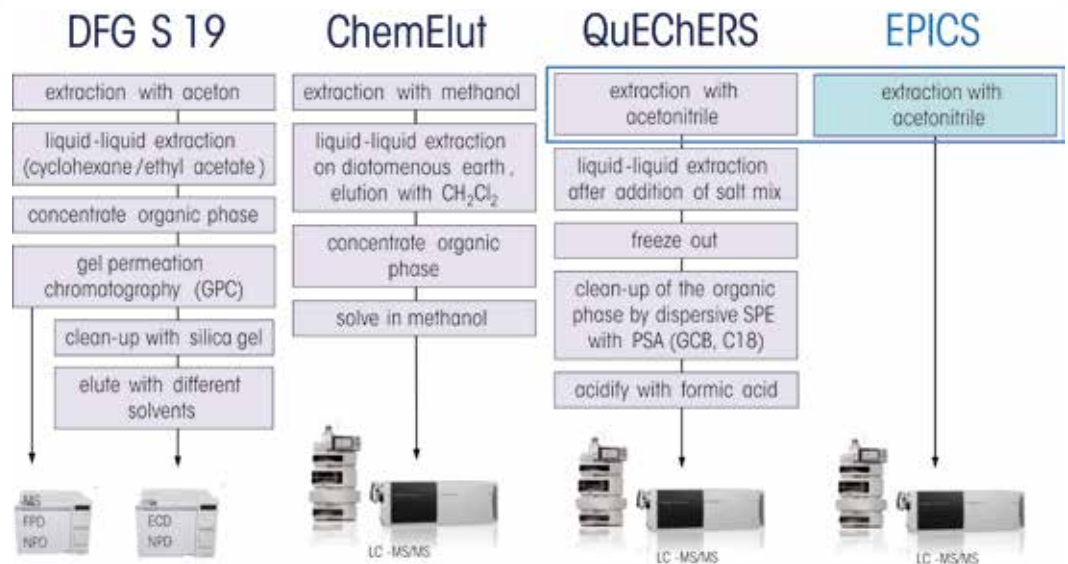


Fig.1 Comparison of the clean-up of different multiresidue methods



The subsequent clean-up is carried out by a special Tailor-made Pesticides HILIC column, coupled to a reversed phase column by a packed loop interface. The pesticides are separated from the matrix compounds in the first dimension. The fraction containing the analytes is transferred to the RP column. The separation of the pesticides is carried out by a classical gradient elution. The MS is working in the MRM mode. [Fig.2]

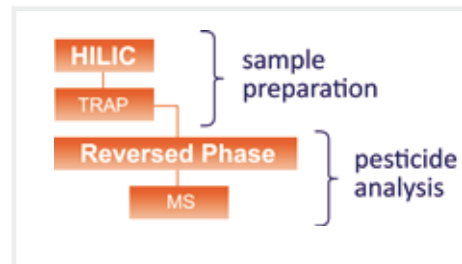
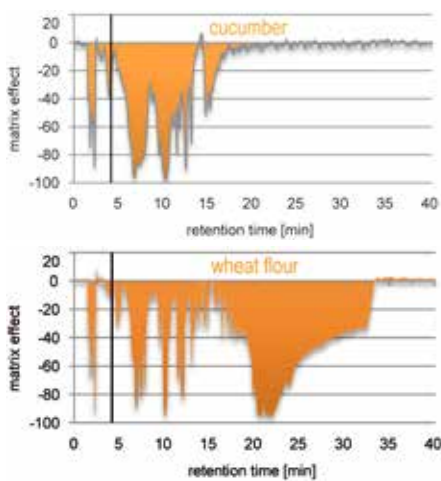


Fig.2 EPICS® operating principle

To compare the matrix effects after the EPICS® approach and the QuEChERS clean-up, post column infusion has been used. For this, a pesticide mix has been continuously infused behind the column. The MS detects the most intensive transitions of each pesticide. By comparing a solvent run to a sample extract run, the matrix effect profiles can be calculated. [Fig.3]

EPICS online matrix removal on HILIC Column



QuEChERS

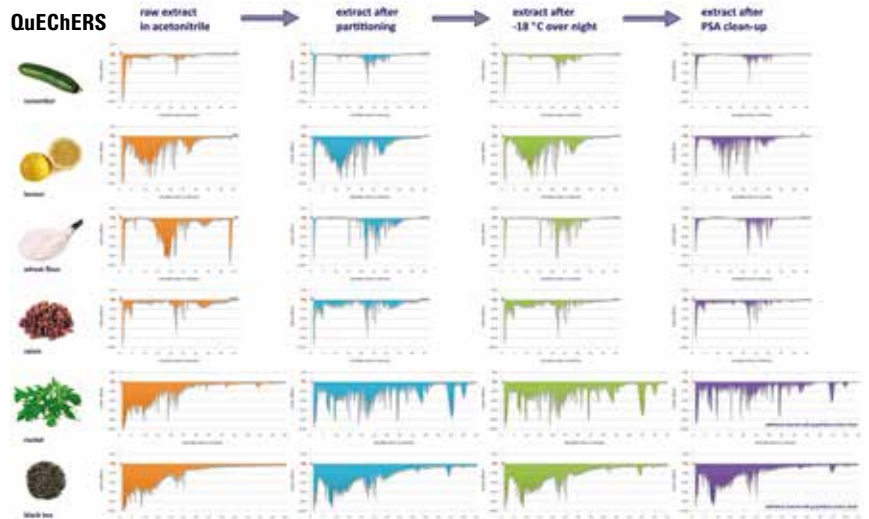


Fig. 3 Comparison of matrix effects in EPICS vs. QuEChERS

Comparison of Methods:

Existing QuEChERS method

Due to the chromatographic approach we obtain a significantly better cleaning effect compared to the classical QuEChERS method. The matrix effect profiles of the intermediate and the final extracts of the QuEChERS clean-up show strong ion suppression even at very late retention times. The clean-up is not able to remove the majority of the matrix compounds.



New EPICS® Method

With EPICS® fewer matrix effects are detected. We can even show that very polar pesticides like Propamocarb are discriminated with QuEChERS [Fig.4]. The robustness of EPICS® has been verified by injecting 100 times very difficult matrices like rocket, black tea and hop spiked with pesticides during one week [Fig.5]. So far more than 300 pesticides can be detected with one raw acetonitrile extract injection from various food matrices. [Fig.6]

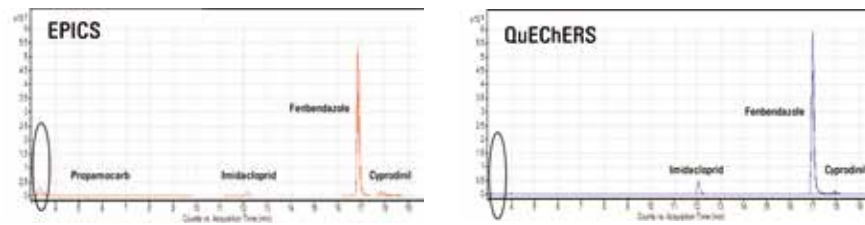


Fig.4 Grape sample analysis comparison EPICS vs. QuEChERS

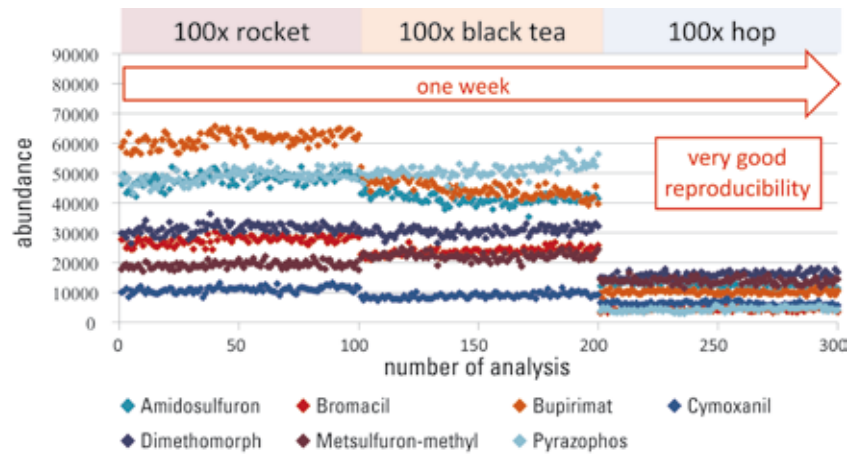


Fig.5 EPICS robustness

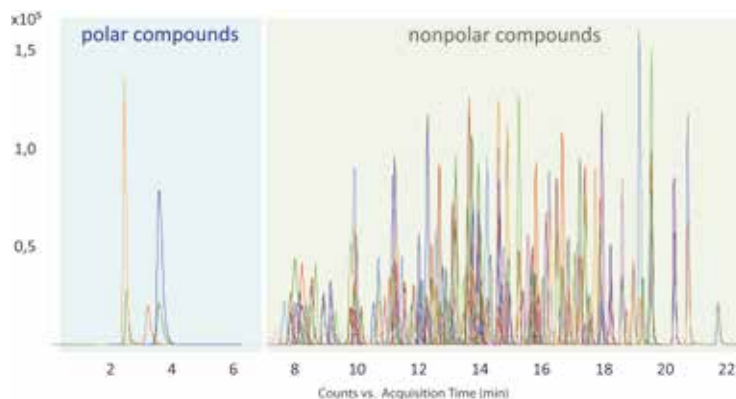


Fig.6 EPICS is validated for more than 300 pesticides in various food matrices



Worldwide scientific and public's interest in the consequences of Pesticides in our Food so rapidly growing?

Why is all over the world scientific and public's interest in the consequences of Pesticides in our Food so rapidly growing ?

Pesticides used on food include:

- insecticides to control insects
- rodenticides to control rodents
- herbicides to control weeds
- fungicides to control mold and fungus
- antimicrobials to control bacteria



Recognizing pesticides registered in the past may not meet today's current safety standards in USA and other countries, the government is reviewing and reregistering older pesticides, taking action to reduce risks where appropriate. EPA will consider the public's overall exposure to pesticides (through food, water, and in home environments) when making decisions to set maximum residue limits (MRLs), or tolerances, for pesticides that can be used on various food and feed commodities Worldwide scientific and public's interest in the consequences of Pesticides in our Food is rapidly growing !

Infants and children may be especially sensitive to health risks posed by pesticides for several reasons:

- their internal organs are still developing and maturing,
- in relation to their body weight, infants and children eat and drink more than adults, possibly increasing their exposure to pesticides in food and water.
- certain behaviours-such as playing on floors or lawns or putting objects in their mouths-increase a child's exposure to pesticides used in homes and yards.

Pesticides may harm a developing child by blocking the absorption of important food nutrients necessary for normal healthy growth. In other ways pesticides may cause harm if a child's excretory system is not fully developed the body may not fully remove pesticides. Also, there are "critical periods" in human development when exposure to a toxin can permanently alter the way an individual's biological system operates.

EPICS Conclusions

- 1- Significant better matrix separation than with established methods
- 2- More than 300 pesticides can be analyzed within 30 minutes
- 3- Even more pesticides can be added if necessary
- 4- EPICS is a validated method by JAS GmbH - Jasem®
- 5- Except for extraction, no other sample clean-up is needed