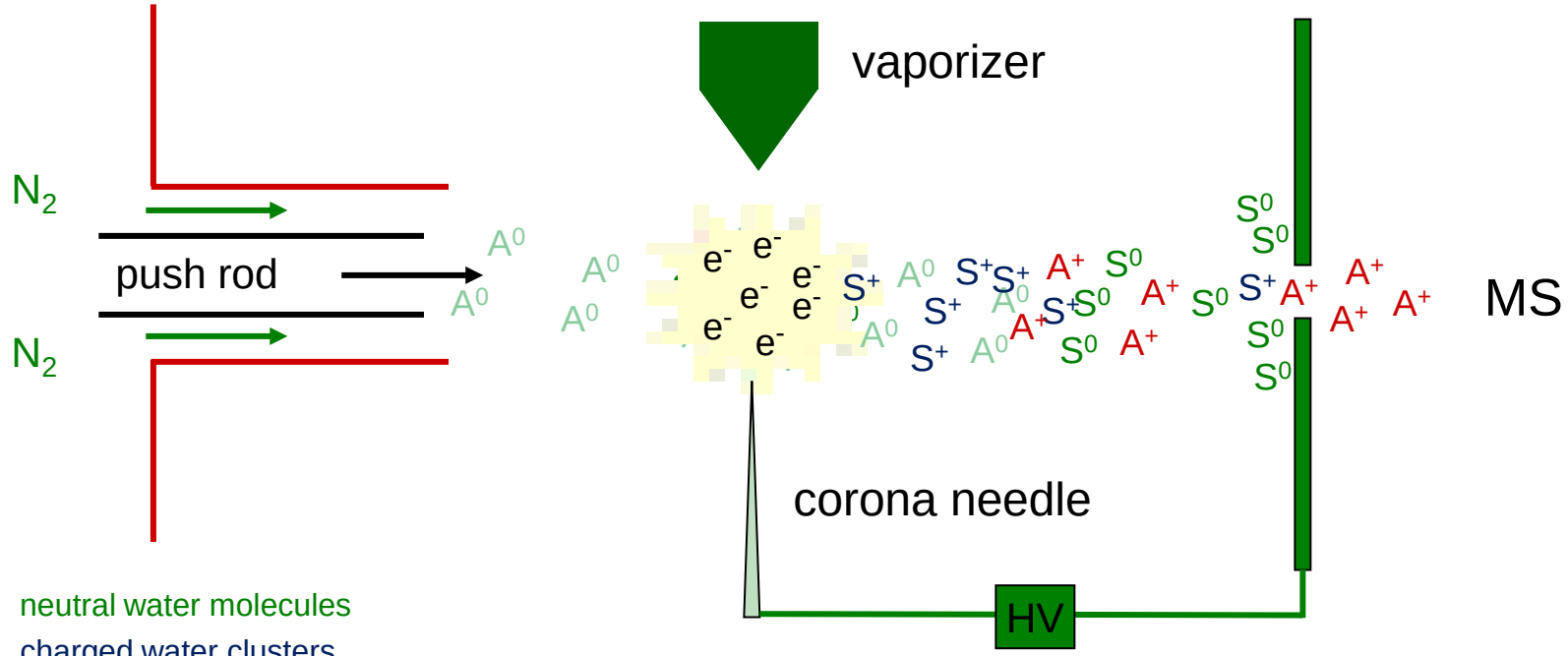
DIP for LC/MS with APCI Source

Available for all Agilent LC/MS

- 6100 SQ
- 6400 QQQ
- 6200 TOF
- 6500 Q-TOF

Principle: DIP-APCI



S^0 neutral water molecules
S^+ charged water clusters
A^0 neutral analytes
A^+ charged analytes

- neutral molecules in the gas phase (water and analytes)
- chemical ionization of the analytes by nitrogen, water and corona discharge
- transfer of the charged analytes into the MS

SIM Scientific Instruments Manufacturer GmbH

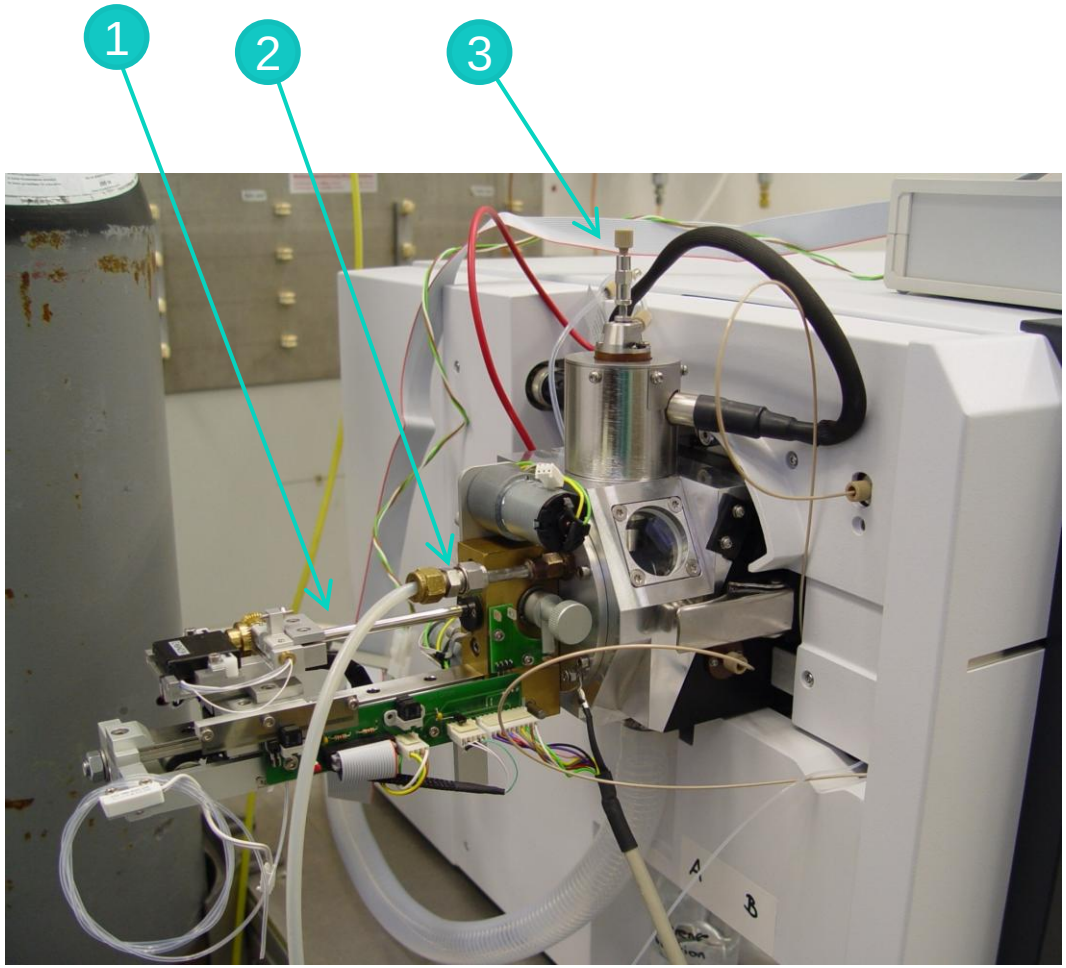
Source:
Prof. Dr. O. Schmitz, UDE Duisburg

Modified APCI Source

(1) Push rod
to insert the sample
temperature controlled

(2) Purge gas: 6L/min
- nitrogen APCI(+)
- synthetic air APCI (-)

(3) Vaporizer



Source:
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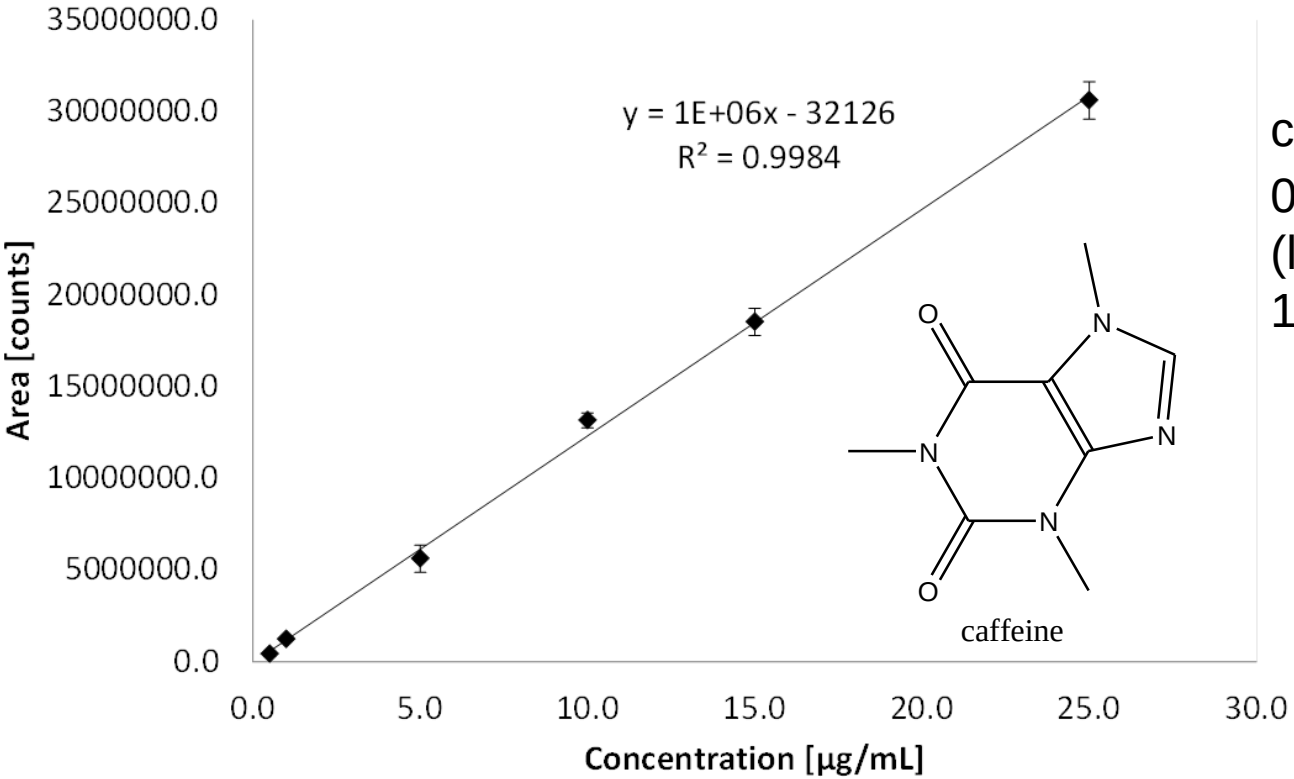
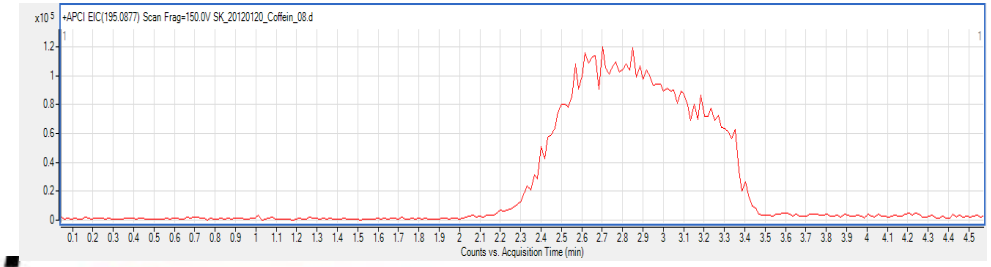
Linearity: Caffeine



caffeine solutions:

0.5-25 µg/mL in CH_2Cl_2
(liquid sampling:
1 µL into the probe tip)



$C_8H_{10}N_4O_2$

M:	194.0804
$[M+H]^+$:	195.0877
$M^{\circ+}$:	194.0798

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Source:
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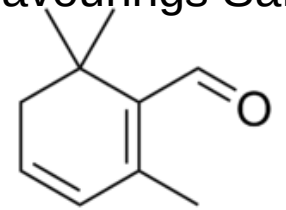
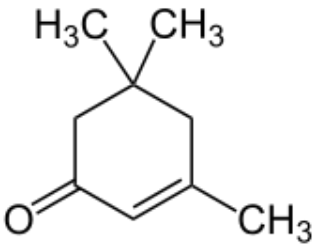
Quality control with DIP-APCI: Food products

Saffron

- Saffron is a spice derived from the flower of *Crocus sativus*, commonly known as the saffron crocus.
- Due to the high price of saffron often wrong saffron is offered on the market.

Flavourings Safranal and Isophorone:





Safranal
$C_{10}H_{14}O$
$[M+H]^+$: 151.1117

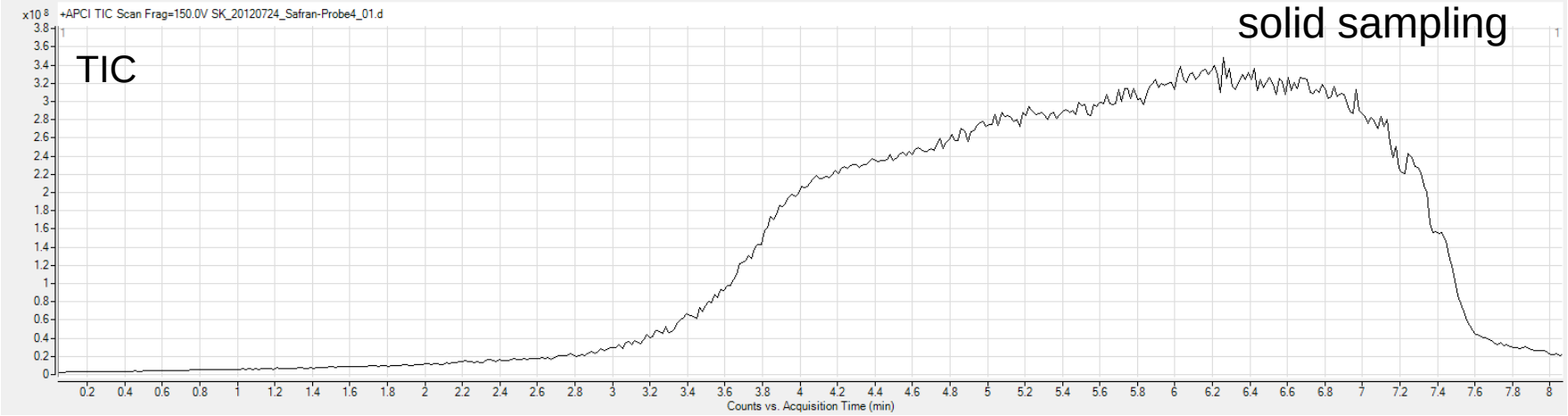
Isophorone
$C_9H_{14}O$
$[M+H]^+$: 139.1117

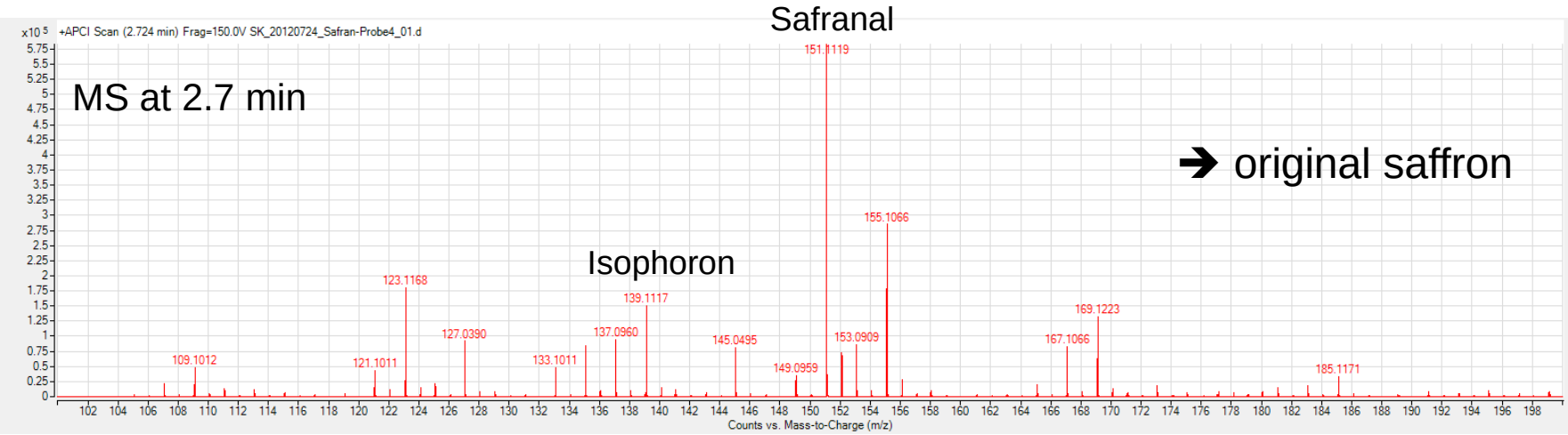
(http://www.saffron.biz/images/ghand.jpg)

Adulteration of saffron:
Multiple distortions; frequent adulteration with safflower

Source:
Prof. Dr. O. Schmitz, UDE Duisburg

Saffron from the company „Fuchs“





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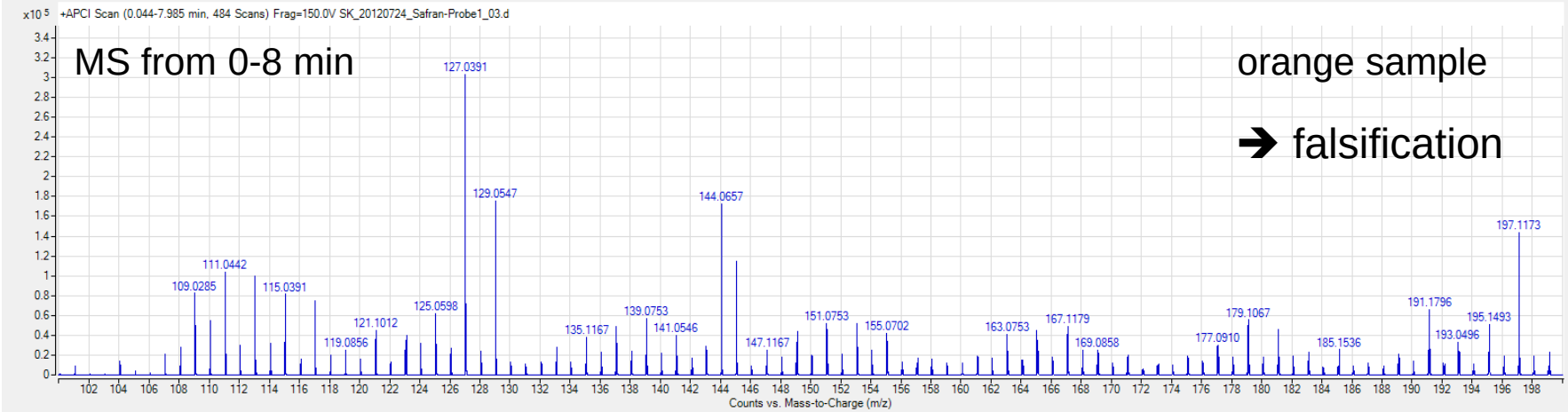
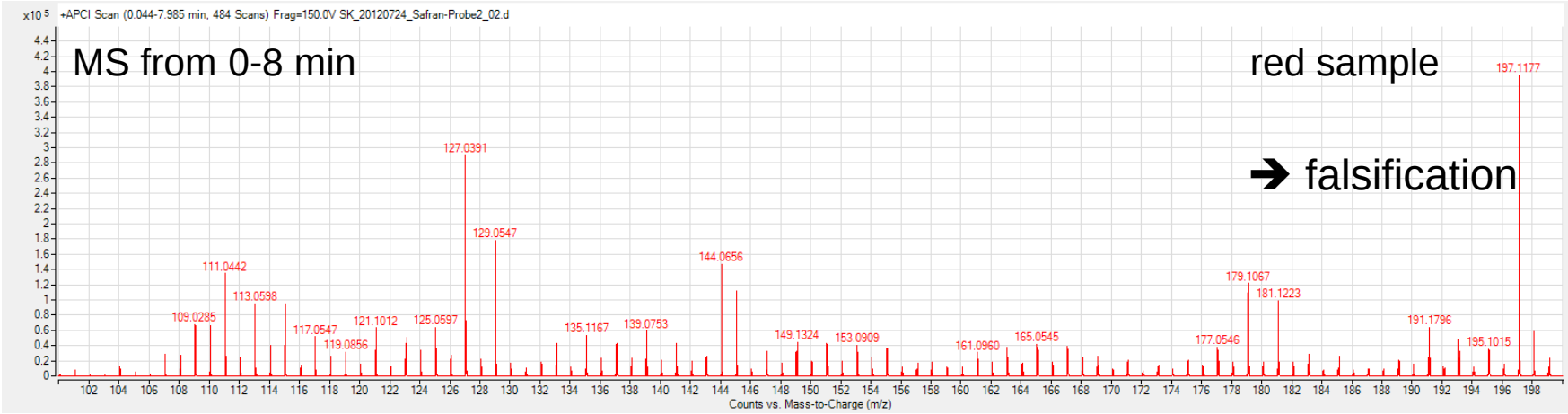
Saffron Samples from Egypt





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Source:
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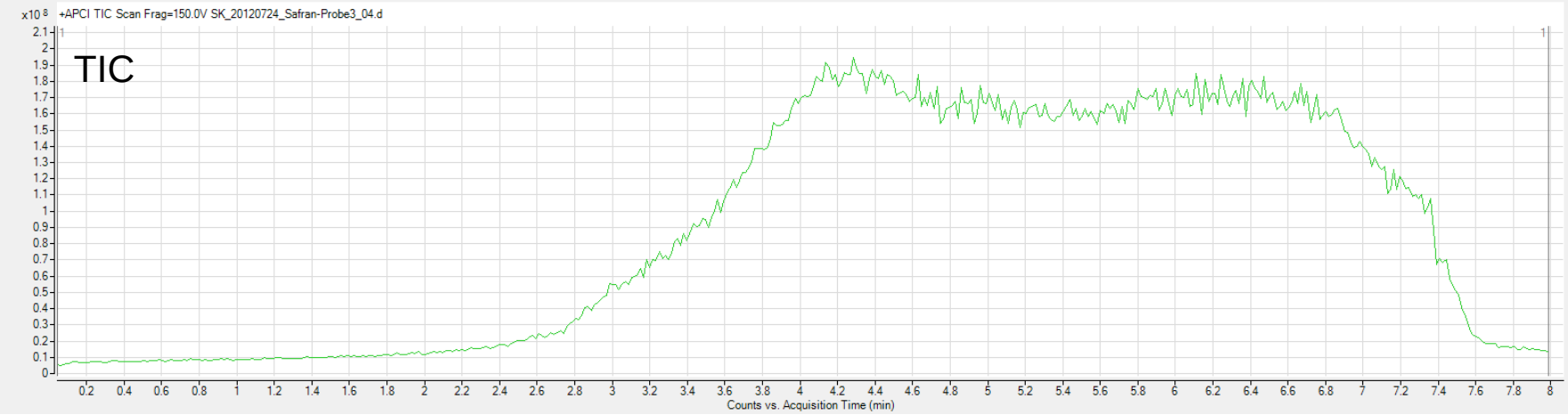
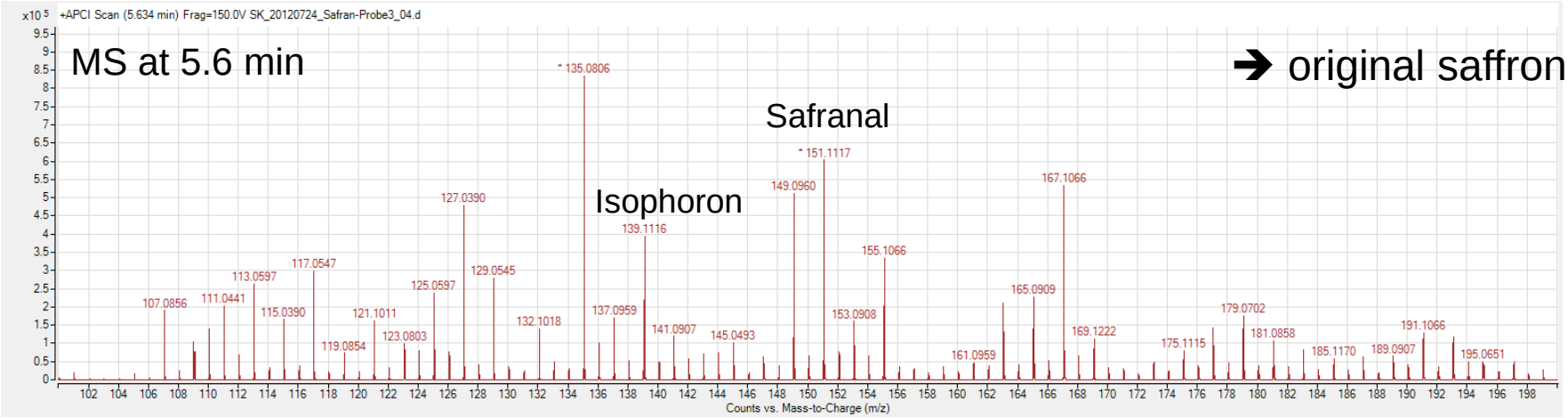
Saffron from a Chinese Supermarket





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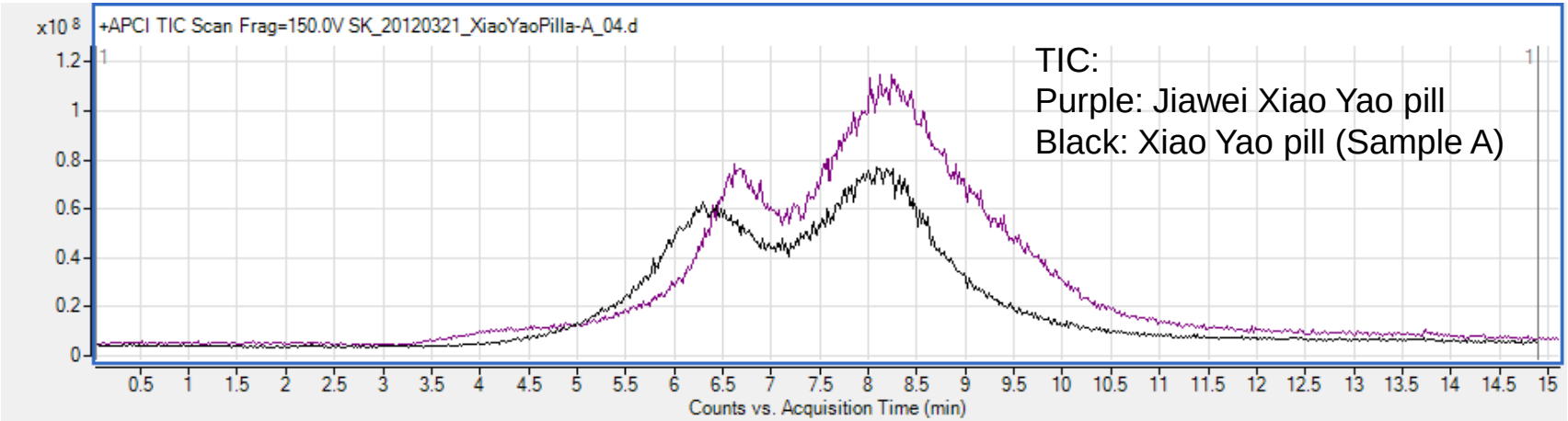
Source:
Prof. Dr. O. Schmitz, UDE Duisburg

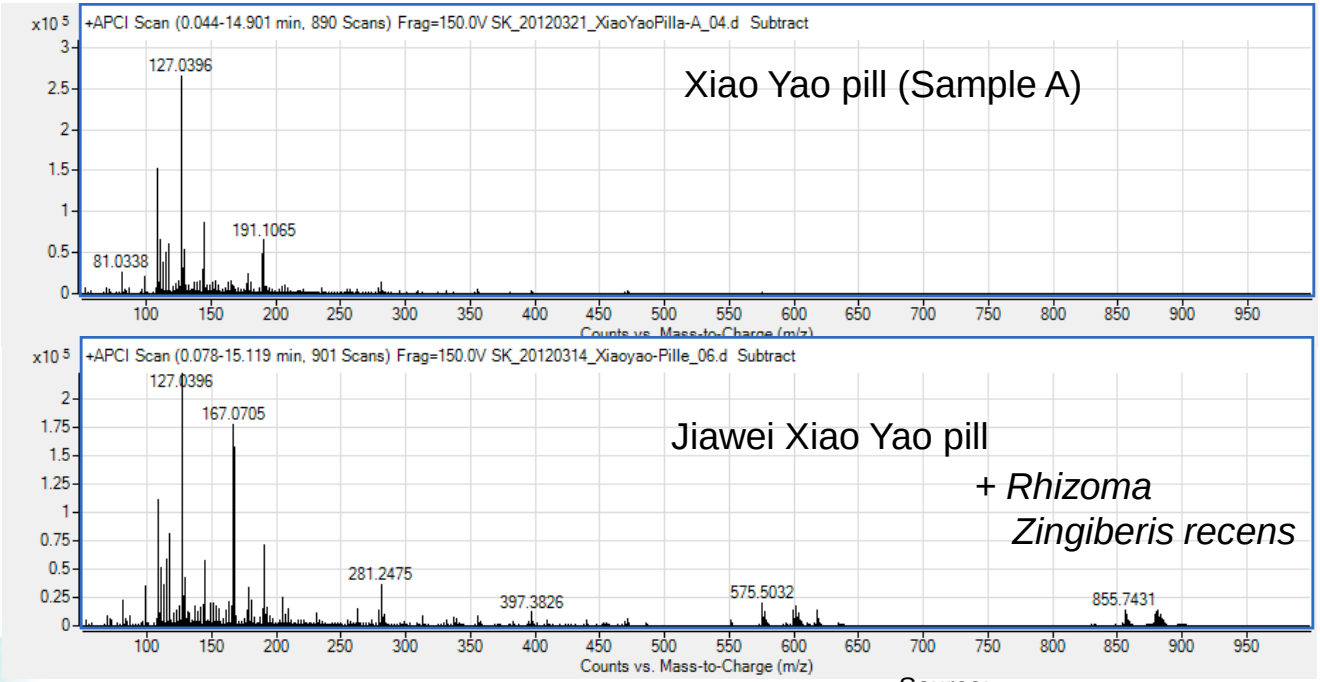
Quality Control in China:
TCM Traditional Chinese Medicine

➔ quality control based on the pharmacist‘s experiences

Source:
Prof. Dr. O. Schmitz, UDE Duisburg

Quality Control of TCM using DIP-APCI





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Source:
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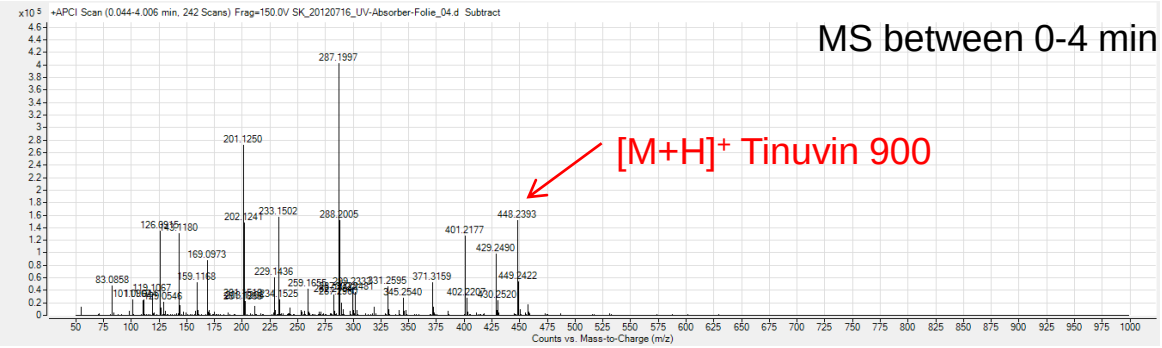
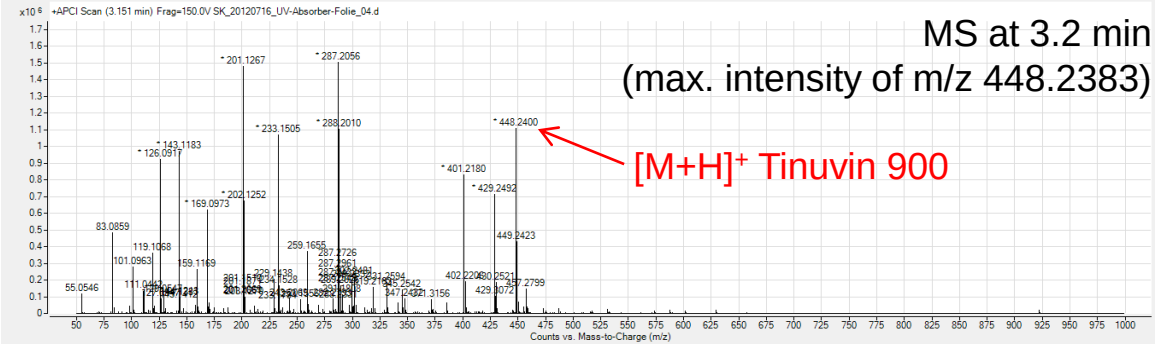
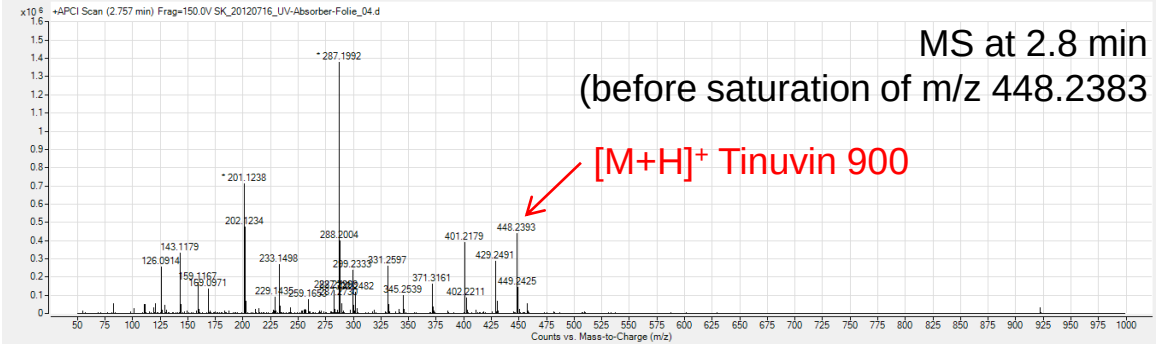
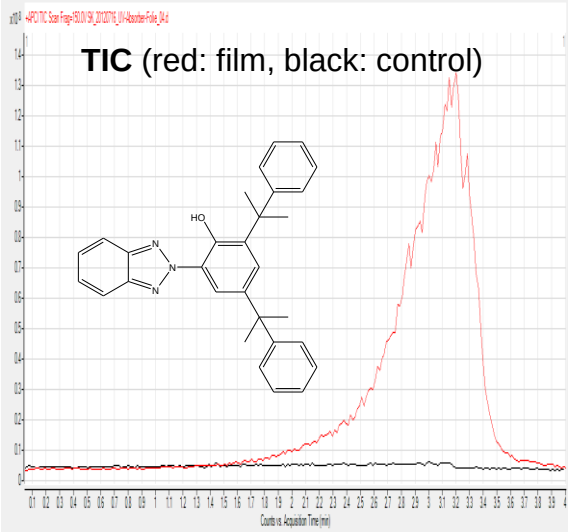
DIP-APCI: UV Absorber in Film









Tinuvin 900: $C_{30}H_{29}N_3O$
$[M+H]^+$: 448.2383 (b.p.: 383 °C)

➔ detection of the UV absorber is possible within 4 min without sample preparation

Source:
Prof. Dr. O. Schmitz, UDE Duisburg

DIP-APCI: Fields of Application

- quality control of industrial products (pharmacy, cosmetics, food, etc.)
- environmental analysis (dust, carbon black, deposits, soils, etc.)
- polymer analysis
- analysis of the smallest quantities of samples (solid and liquid biogenic samples)
- direct analysis of samples containing sugar below 150 °C
- recording of temperature profiles