

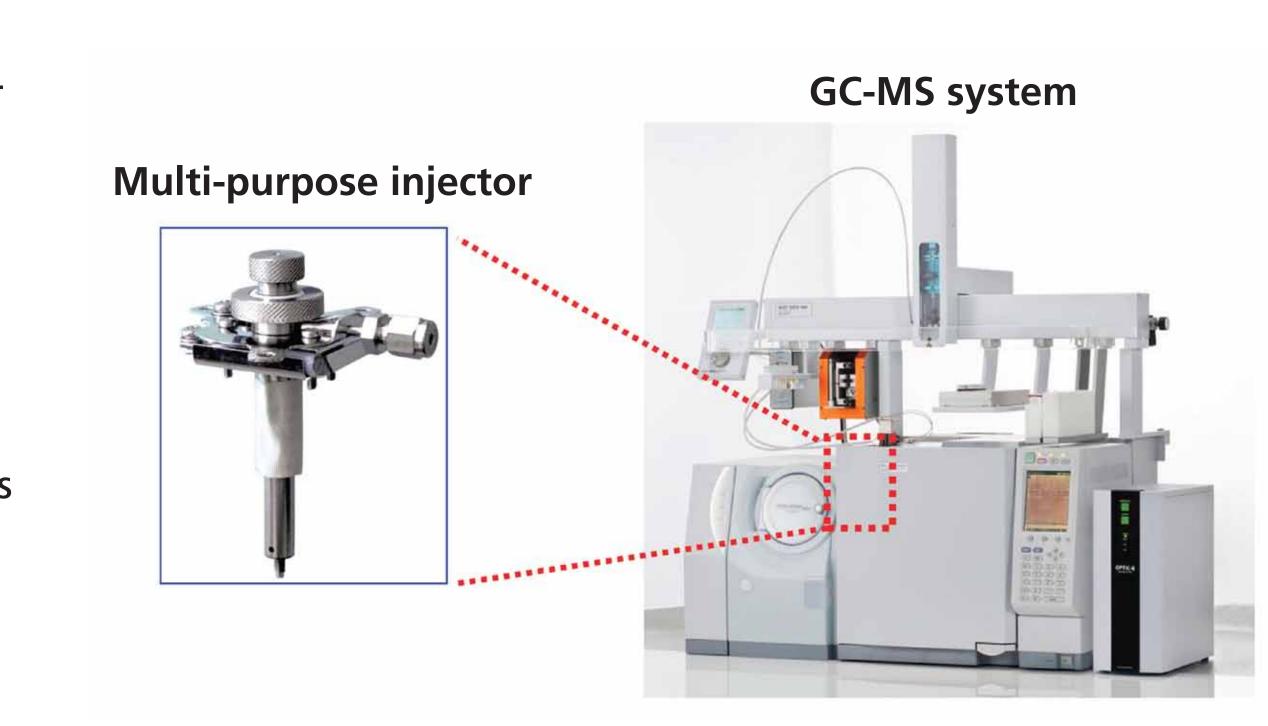
GC-MS System Equipped with Multi-purpose Injector

Riki Kitano¹, Haruhiko Miyagawa¹, Richard R Whitney², Mark Taylor², Atsushi Sato³, Mitsuhiro Kurano⁴ ¹Shimadzu Corp., ²Shimadzu Scientific Instruments, Inc., ³GL Sciences, Inc., ⁴ATAS GL International B.V.

Introduction

Specific dedicated sample introduction devices are commonly connected to GC-MS systems, depending on sample matrix and target compounds. However, attachment of multiple sample introduction devices such as liquid injection, thermal desorption (TD) or pyrolysis (PY) to a single GC-MS system is difficult. It is also time-consuming and labor-intensive to exchange sample introduction devices. A multi-purpose injector has been developed, where only exchange of an injection port liner is required for switching to alternate injection modes or sample introduction techniques.

In this study, an ATAS Optic 4 Multipurpose Injector with LINEX Liner Exchange (ATAS GL) was connected to a Shimadzu GCMS-QP2010 Ultra (Shimadzu Corp.) to provide a flexible GCMS analysis system using multiple injection modes for various sample types.



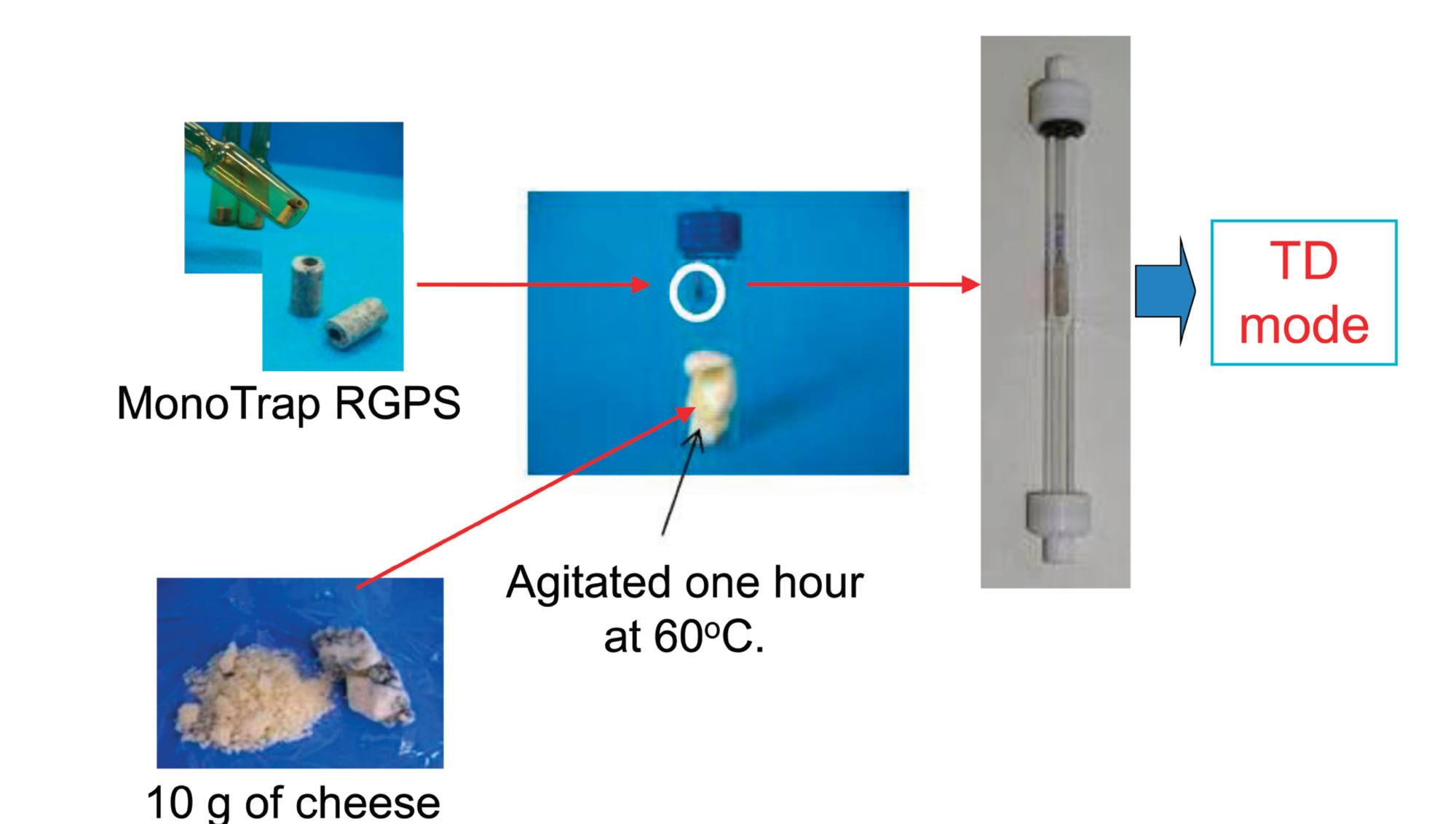
Conclusions

- 1. The results obtained using the multi-purpose injector are similar to those obtained using dedicated sample introduction equipment.
- 2. The chromatographic peak width is shown to be dependent on the temperature ramp rate; a fast temperature ramp rate results in improved chromatographic resolution.
- 3. Using Monolithic Material Sorptive Extraction (MMSE) and the system with a multi-purpose injector, sulphur compounds such as dimethyl disulfide and dimethyl sulfone from the cheese were extracted and detected. It is known to be difficult to detect sulphur compounds using a conventional TD system.

Experimental Injection port liner

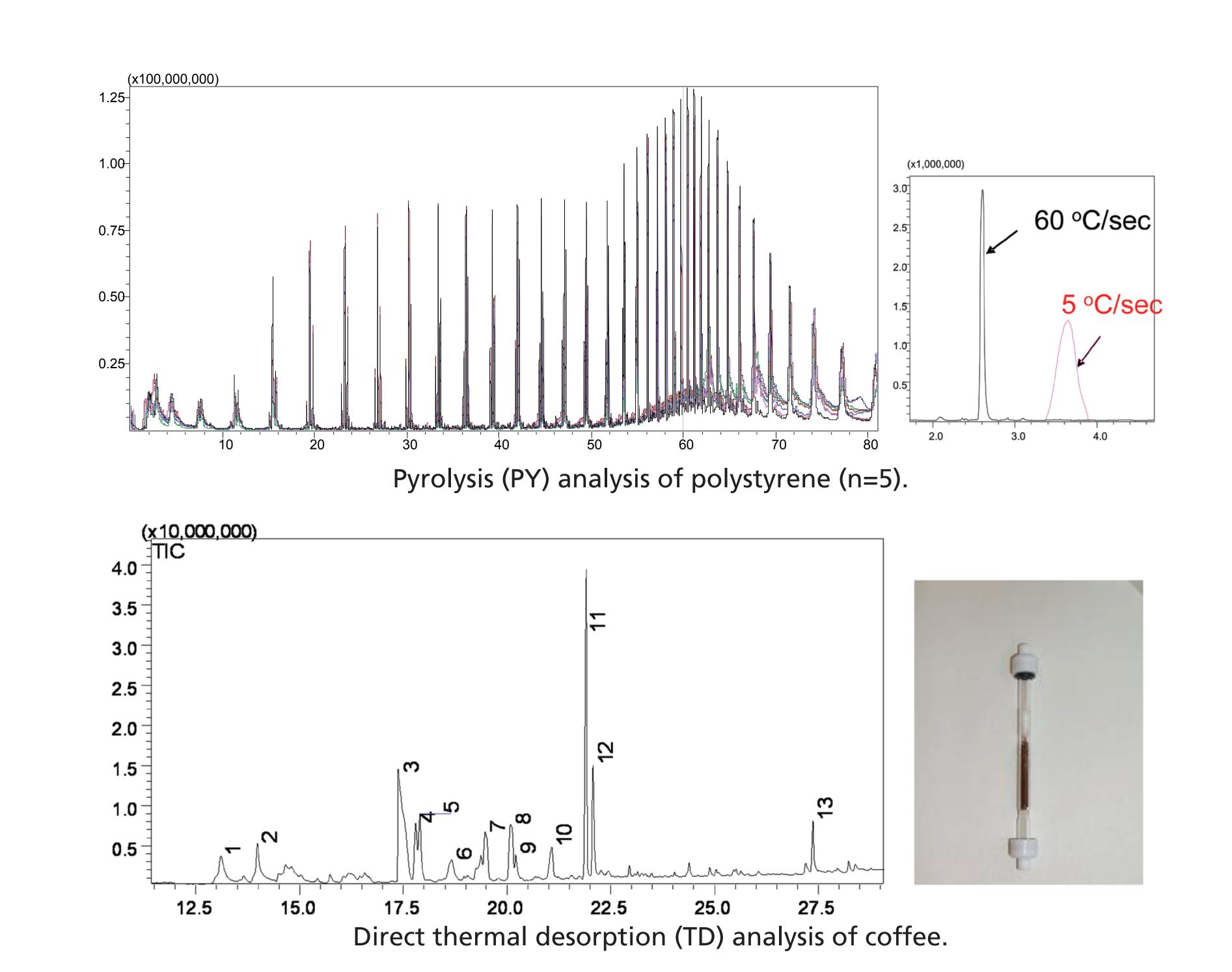
	Liner	Inj. Mode
а	LVI liner	Liquid inj.
b	Liner packed with Tenax	TD
С	Baffled splitless liner	Liquid inj.
d	DMI liner	PYR and DMI
е	On-column liner	Liquid inj.

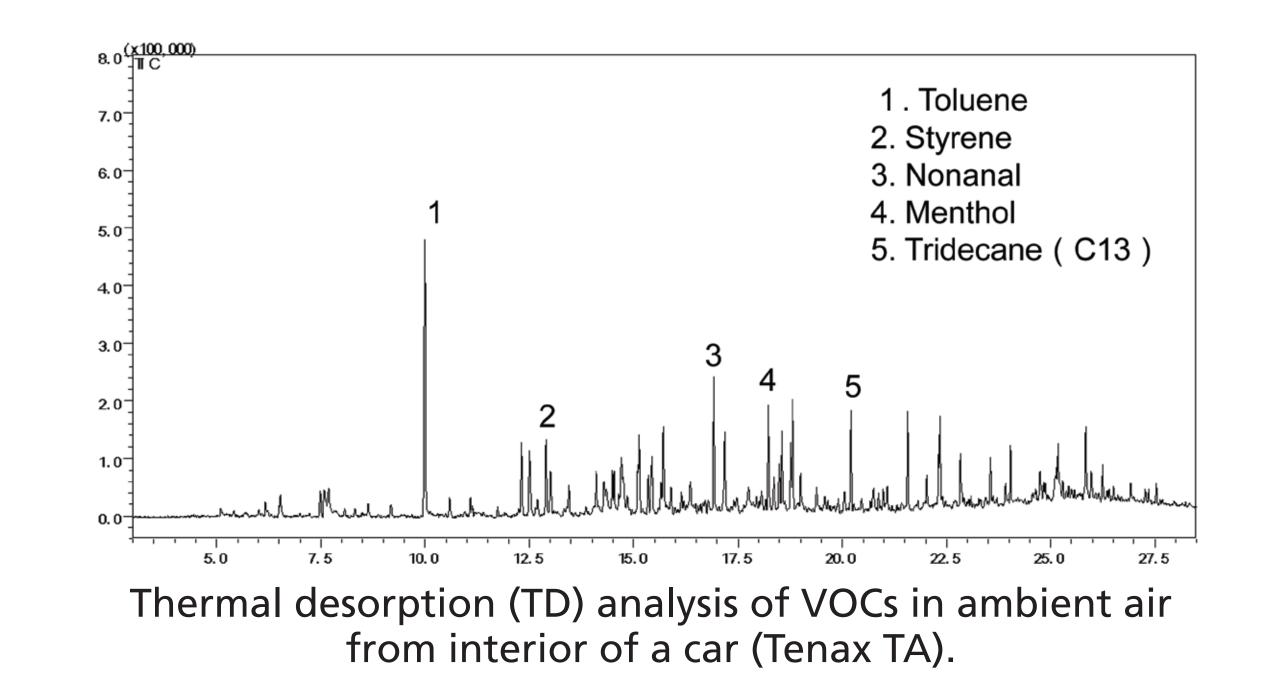
Monolithic Material Sorptive Extraction (MMSE) and TD

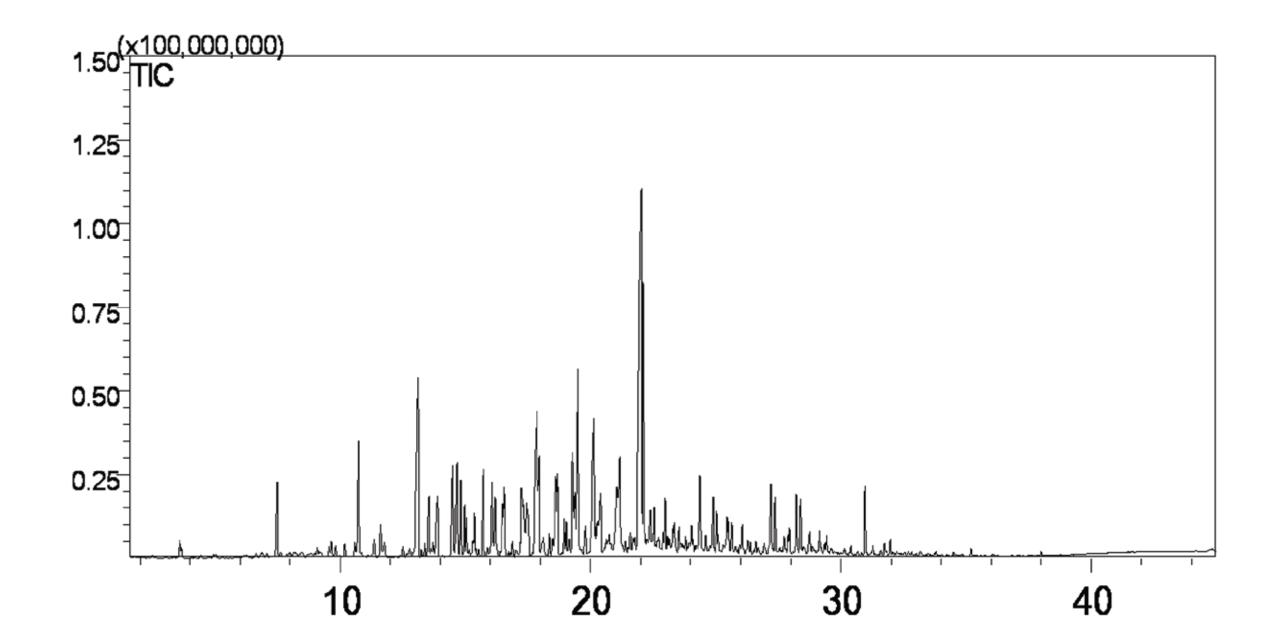


Results and discussion

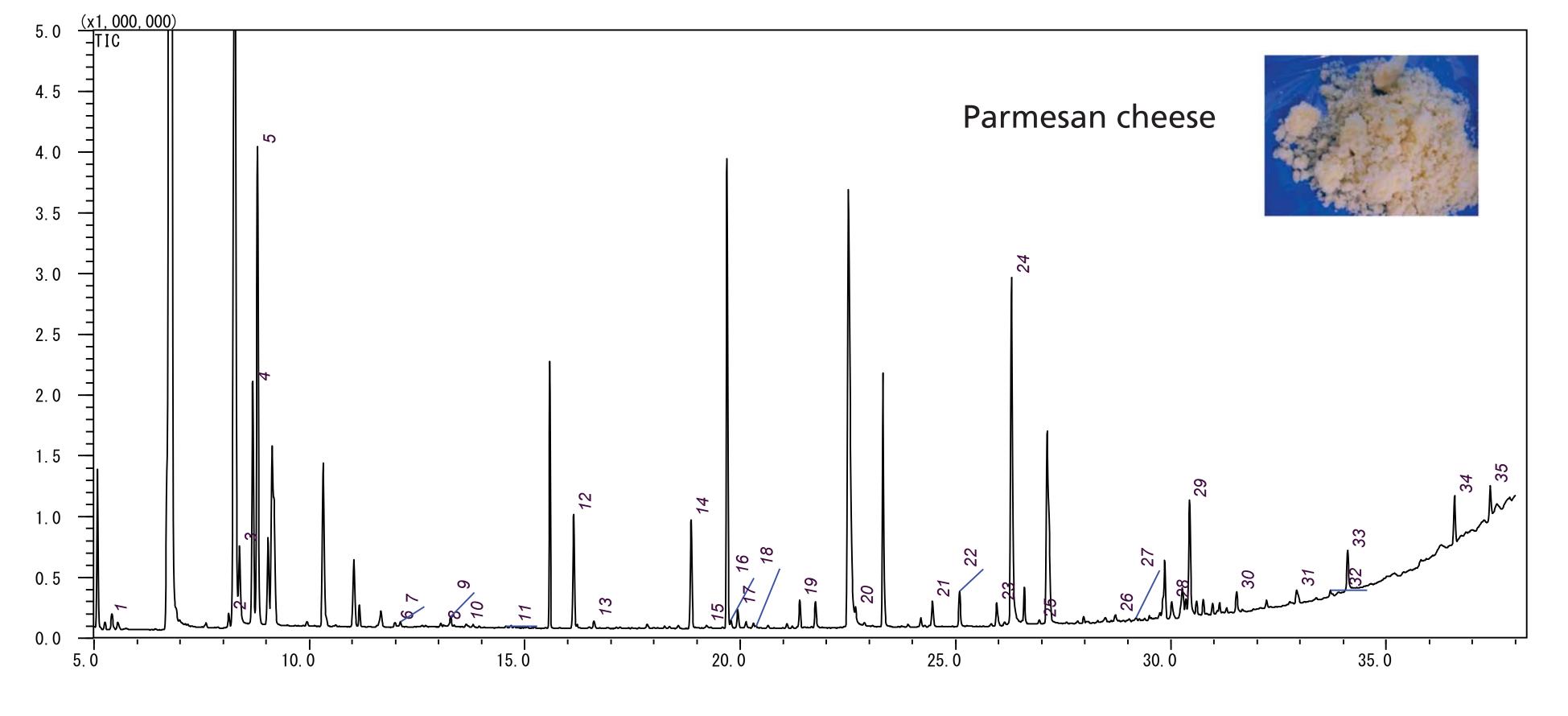
Injection modes





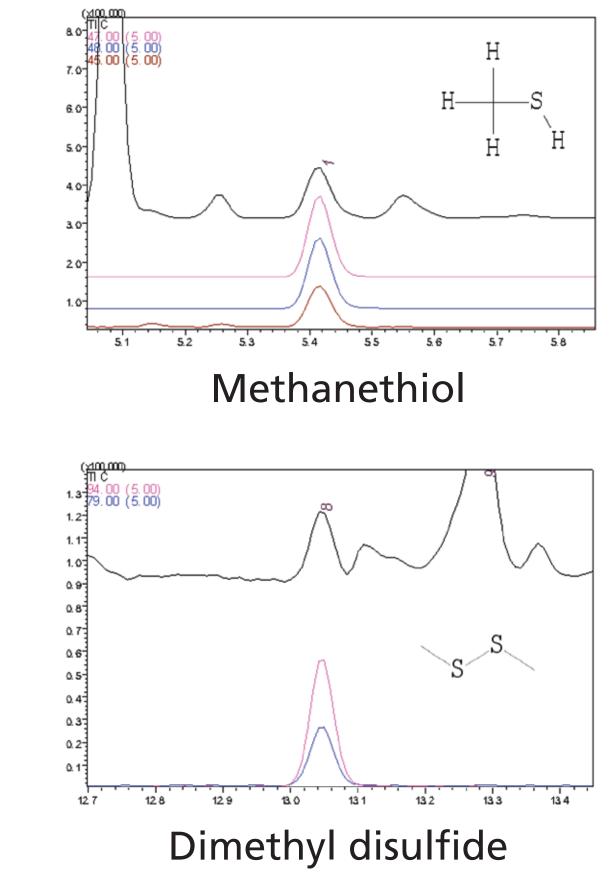


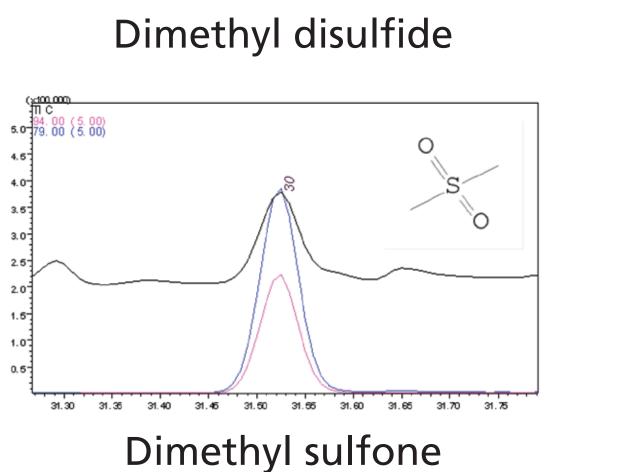
TD analysis of headspace from a coffee sample (Tenax TA).

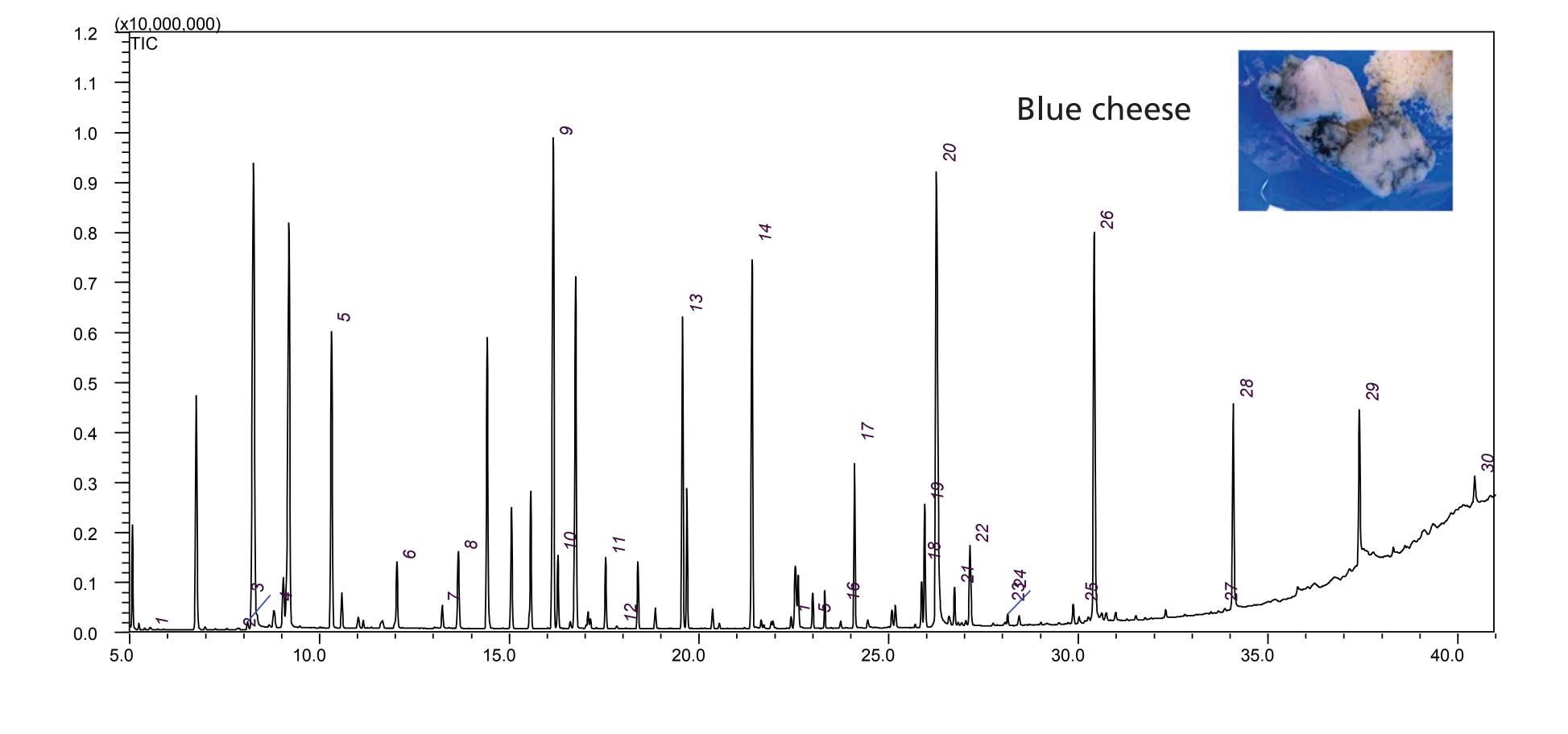




- 10. 2-Pentenal, 11. 3-Penten-2-one 12. 2-Heptanone, 13. D-Limonene, 14. Acetoin,
- 15. Acetol, 16. Dimethylpyrazine, 17. Dimethylpyrazine, 18. Dimethylpyrazine, 19. 2-Nonanone, 20. 2,5-Dimethyl-3-ethylpyrazine, 21. Benzaldehyde, 22. Isobutyric acid,
- 23. 2-Undecanone, 24. Butanoic acid, 25. 2-Furanmethanol, 26. Acetamide, 27. 2-Tetradecanol, 28. 2-Tridecanone, 29. Hexanoic acid, 30. **Dimethyl sulfone**,
- 31. δ-Octalactone, 32. 2-Pentadecanone, 33. Octanoic acid, 34. δ-Decalactone,
- 35 .Decanoic acid







- 1. Acetaldehyde, 2. Butanal, 3. Ethyl Acetate, 4. Isovaleraldehyde,
- 5. 2-Pentanone, 6. Ethyl butyrate, 7. 2-Hexanone, 8. Isobutyl alcohol,
- 9. 2-Heptanone, 10. Methylhexanoate, 11. Ethylhexanoate, 12. 1-Pentanol,
- 13. 2-Heptanol, 14. 2-Nonanone, 15. Ethyloctanoate, 16. 2-Decanone,
- 17. 2 Negerial 10 Methyldecopaeta 10. 2 Undecopaeta 20. Dutenois
- 17. 2-Nonanol, 18. Methyldecanoate, 19. 2-Undecanone, 20. Butanoic acid,
- 21. Ethyldecanoate, 22. 3-Methylbutanote, 23. γ -Caprolactone,
- 24. 2-Undecanol, 25. 2-Tridecanone, 26. Hexanoic acid, 27. 2-Pentadecanone,
- 28. Octanoic acid, 29. Decanoic acid, 30. Dodecanoic acid