SHIMADZU
Excellence in Science

Application Data Sheet

No. 99

GC-MS
Gas Chromatograph Mass Spectrometer

Analysis of Ethylene in Food Using GC/MS

Ethylene is a type of plant hormone. It promotes the growth of fruits and vegetables, and suppresses the sprouting of potatoes. This experiment details the analysis of ethylene produced by apples.

Experiment

A 5 g apple sample was packed into a 20 mL headspace vial and heated for one hour at 80 °C. 1 mL of the gas phase inside the vial was collected with a gas tight syringe, and injected into the GC-MS. Table 1 shows the analysis conditions.

Table 1: Analysis Conditions

GC-MS:	GCMS-QP2010 Ultra
Column:	Rt-Q-BOND (30 m L. × 0.32 mm I.D., df = 10 μm) + guard column (MS side, 3 m L. × 0.32 mm I.D.)
Glass Insert:	Split insert (P/N: 225-20803-01)

[GC]

Injection Volume:	1 mL
Injection Unit Temp.:	200 °C
Column Oven Temp.:	35 °C (3 min) → (10 °C /min) → 260 °C (5 min)
Carrier Gas Control:	Constant linear velocity (61.6 cm/sec)
Sample Introduction:	Split
Split Ratio:	30
Carrier Gas:	Helium

[MS]

Interface Temp.:	200 °C
Ion Source Temp.:	200 °C
Acq. Mode:	Scan (*m/z* 10-300)
Event Time:	0.3 sec
Ionization Mode:	EI

Analysis Results

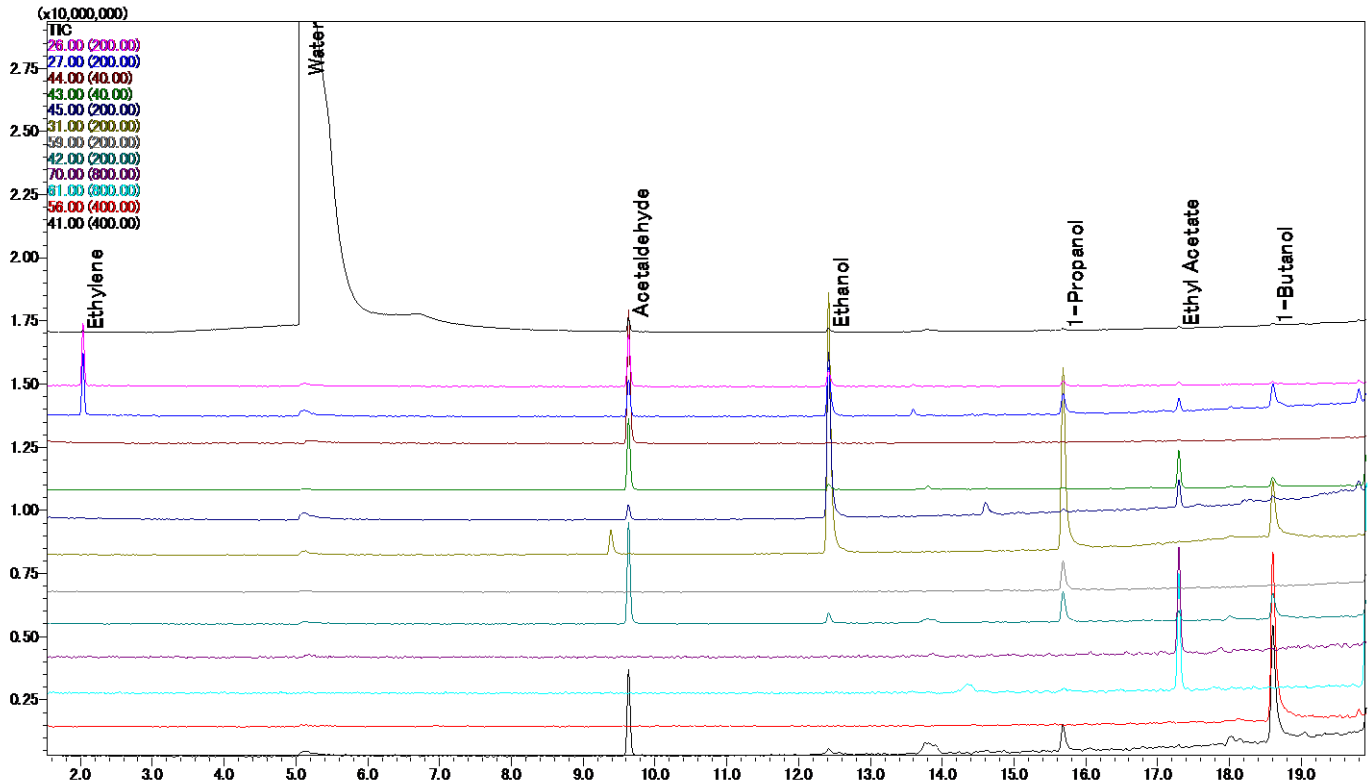

Fig. 1: Total Ion Chromatogram (TIC) and Mass Chromatogram (MC) for Gas Produced by the Apple Sample

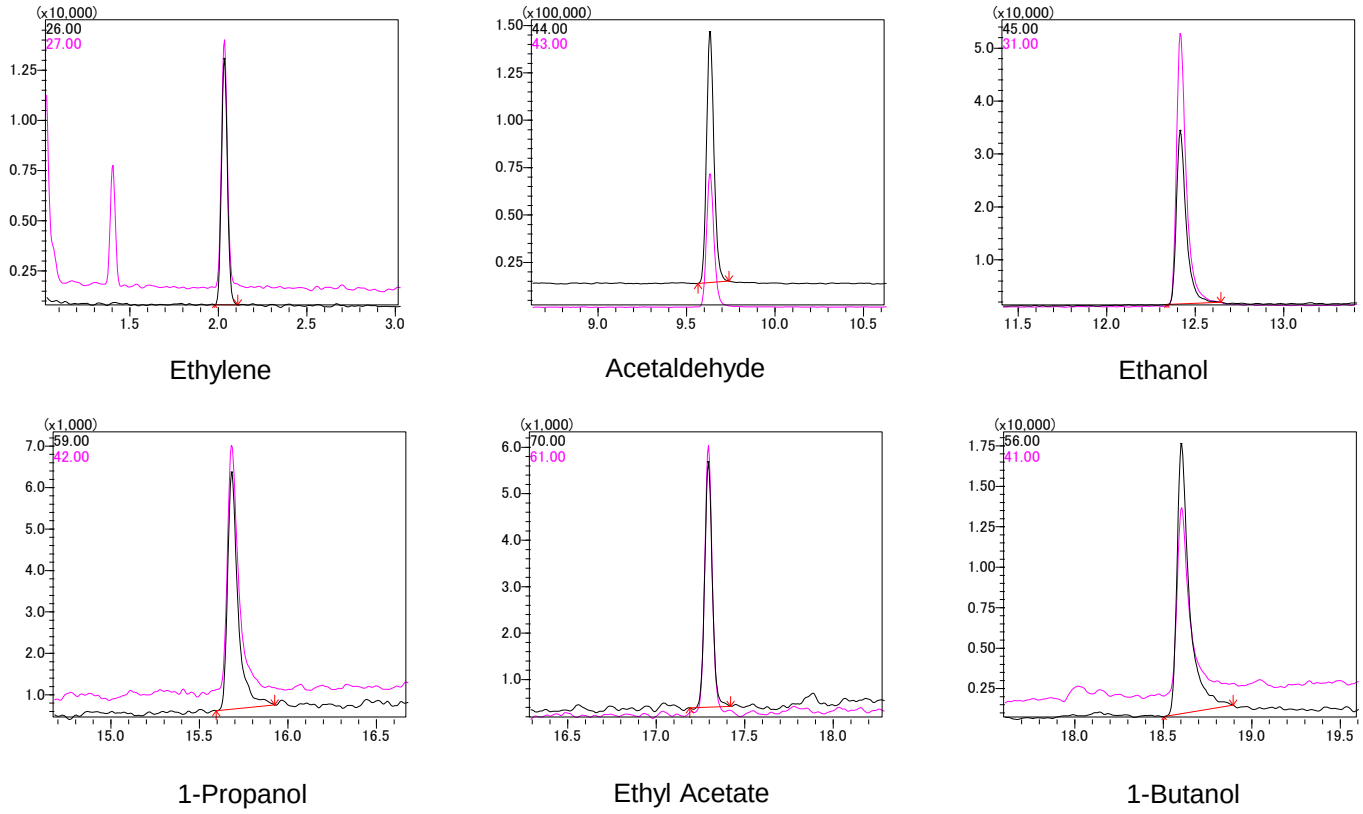

Fig. 2: Mass Chromatograms of the Respective Components (Enlarged View)

Summary

Using GC/MS analysis, six components including ethylene were identified in the gas produced by the apple sample. It was confirmed from the mass chromatogram that the ethylene peak was well separated and detected with a high degree of sensitivity.

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Shimadzu Corporation
www.shimadzu.com/an/