

Low level ethylene in air

Application Note

Environmental

Authors

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Introduction

Certain fruits emit ethylene gas as they mature and ripen. The presence of ethylene is a signal to the fruit to begin the ripening process. Kiwi will begin to ripen in the presence of as little as 10 ppb ethylene. The fruit storage and packing industry is required to scrub ethylene from their storage facilities to prevent premature ripening of stored fruit which could spoil an entire lot before shipment to market. If ethylene is detected using the system described in this application note, an alarm can be triggered using a custom solution software package, and appropriate steps can be taken to eliminate the problem.

Experimental

A schematic of the system is shown in Figure 1. Sample is introduced into the system by first trapping the analyte of interest onto an Agilent Sample Preconcentration Trap (SPT). Once an appropriate amount of analyte has been trapped, the SPT is desorbed to the column for detection by FID.



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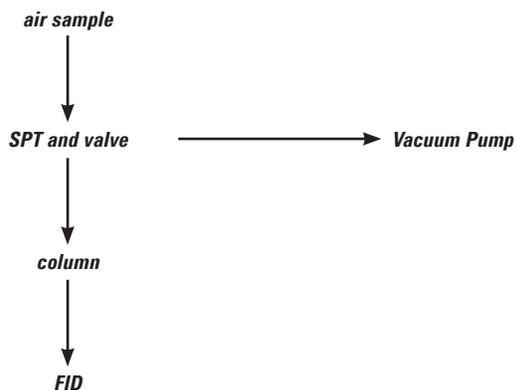


Figure 1. Schematic of Ethylene in Air

Table 1: Chromatographic Parameters

Sample	: 30 mL/min for 4 minutes
Column 1 SPT	: Tenax/Carbopack B/Carbosieve S-III
Column 2	: Agilent PorapLOT Q, 0.53 mm x 25 m, Part no.CP7554
Carrier Gas	: Helium, 10ml/min Make-up, 20 mL/min
Column Oven	: 40 °C
FID	: 300 °C
Trap Temp	: 20 °C
Desorb Temp	: 180 °C

Precision and Method Detection Levels

The relative standard deviation for a series of six runs at 2 ppb ethylene was 7.23%. A method detection level of approximately 2 ppb ethylene was found (Figure 2) using the parameters shown above. If a lower trap temperature and increased sample volume is used, a lower level of detection is possible. However, cryogen usage would also increase.

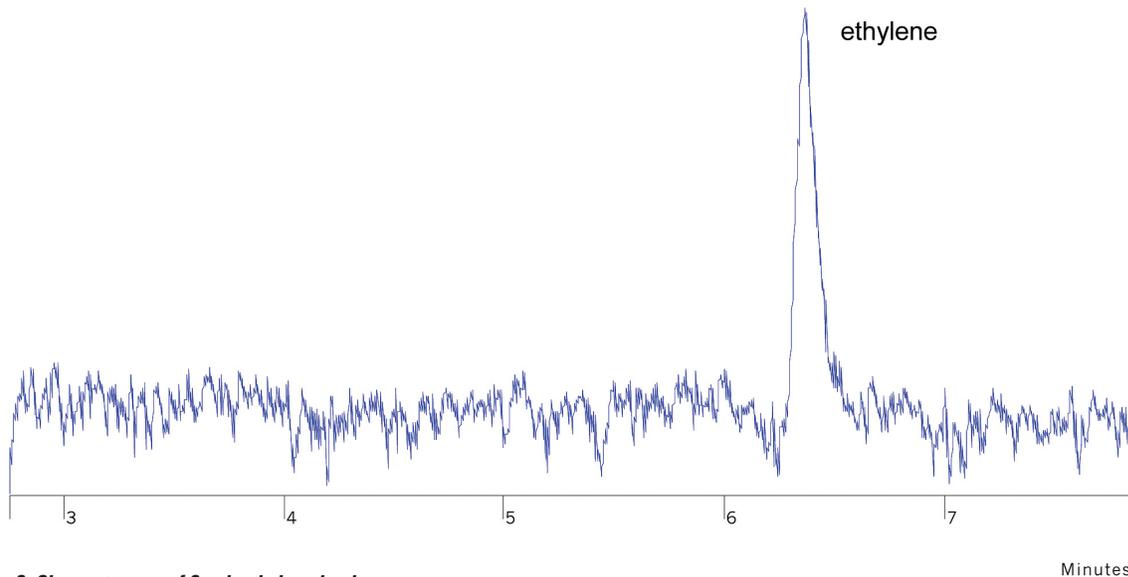


Figure 2. Chromatogram of 2 ppb ethylene in air

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