



APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Bulk Headspace Sampling - Apples and Oranges

Dynamic headspace sampling is a simple, solvent-free way to analyze materials for volatile organic compounds. The CDS Analytical Model 6000 Sample Concentrator may be equipped with a “bulk” headspace sampler which is 95 mm in diameter and 110 mm deep, permitting the analysis of large objects intact, with no sample preparation required. The sample object is simply sealed into the temperature controlled vessel and allowed to come to thermal equilibrium. For efficient headspace sampling, a built-in vacuum pump withdraws the atmosphere around the sample through a Tenax trap. After the volatiles have been collected, they are backflushed from the trap to the gas chromatograph for analysis.

Figure 1 shows the chromatogram produced from the volatiles collected by sampling an orange at 50 °C for 10 minutes. The whole, uncut fruit was placed into the sampling vessel and allowed to equilibrate before the vacuum pump was turned on. After sampling, the orange was removed from the vessel, which was allowed to rest at 50 ° with the top off to vent residual volatiles and prepare for the next run.

Figure 2 shows the results for a Red Delicious apple sampled using the same method. For maximum sensitivity, the gas chromatograph was equipped with a 0.53 mm capillary column which was used without split.

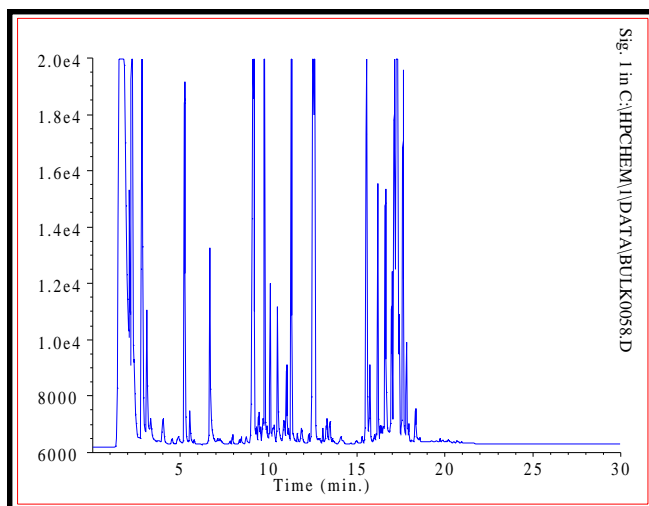


Figure 1. One whole orange at 50 °C

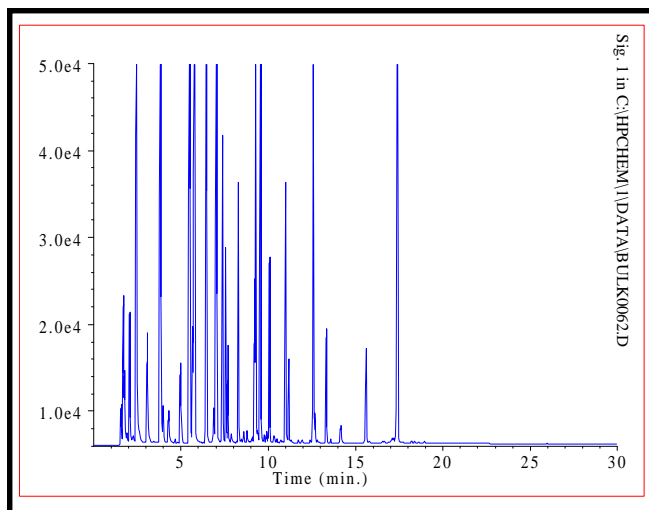


Figure 2. One whole apple at 50 °C

Equipment

Samples were processed using a CDS Model 6000 Sample Concentrator, interfaced to a Hewlett-Packard 5890 gas chromatograph with a flame ionization detector.

Model 6500 Conditions

Valve oven: 250 °C
Transfer Line: 250 °C
Sample Temperature: 50 °C
Time: 20 min
Flow: 25 ml/min
Trap: Tenax, ambient
Desorption: 300 °C for 4 min

Gas Chromatograph Conditions

Carrier: He
Column: SE-54
30 m x 0.53 mm
Initial temperature: 40 °C for 2 min
Ramp: 8 °C/min
Final temperature: 300 °C for 5 min
Detector: FID

For more information concerning this application, we recommend the following reading:

T. P. Wampler, W. A. Bowe and E. J. Levy, Splitless Capillary GC Analysis of Herbs and Spices using Cryofocusing, *American Lab*, October, 1985.

T. P. Wampler, Thermal Desorption for GC Sample Preparation, *LC GC*, 16 (3) 812 (1998).

T. P. Wampler, Analysis of Food Volatiles using Headspace-GC Techniques, in R. Marsili (Ed.) *Techniques for Analyzing Food Aroma*, Marcel Dekker, New York, 1997.

Additional literature on this and related applications may be obtained by contacting your local CDS Analytical representative, or directly from CDS at the address below.

CDS Analytical, Inc. has been a leader in the design and manufacture of laboratory instruments for sample preparation and analysis since 1969. We are dedicated to providing the best possible instruments for both research and routine analysis. Well known in the field of pyrolysis, CDS manufactures the Pyroprobe® 1000 and 2000 for the introduction and analysis of solid materials by GC, MS and FT-IR. CDS offers a complete line of dynamic headspace instruments for the analysis of volatile organic compounds in environmental, pharmaceutical and food applications, as well as custom systems for complex, multicomponent materials investigation. Our customers, their requirements and applications are important to us. To help meet your needs, we offer a wide range of analytical information and the services of our applications laboratory. If you would like additional information, please contact us at the address below, or call us at 800-541-6593.

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