

CDSolutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Quantitation of C₂ to C₄ Carbonyls by Purge & Trap

Purge and trap has been used as an analytical technique for many years, in the analysis of volatile organic compounds in drinking water and waste water. Organic trace volatiles such as C₂-C₄ aldehydes and ketones have also been quantitated and qualified using purge and trap. The sample is normally purged from water using an inert carrier gas (N₂ or He), trapped onto an adsorbent bed, and then thermally desorbed to a GC/MS for quantitation.

A 10 µMole solution containing acetaldehyde, propanal, butyraldehyde, acetone, and 2-butanone was prepared in distilled water. Serial dilutions were made from the stock and consisted of stock (10 µM), dilutions 5 µM, 1 µM, 0.5 µM, and 0.25 µM. A 5 ml sample of each dilution was then placed into the 5 ml sparging vessel of a CDS 7000 Sample Concentrator, which was interfaced to a GC/MS (ion trap). Each dilution was sparged for eleven minutes at ambient temperature and collected on a Vocarb mutibed trap. The trap was desorbed for four minutes at 250°C to the GC/MS.

Figure 1 shows the 10 µM chromatogram of the component mixture. The elution order is propanal (1), acetone (2), butyraldehyde (3), 2-butanone (4), and acetaldehyde (tetramer) (5). Figure 2-6 show linearity plots of each compound and each dilution. Each data point is an average area based on three runs. Plot correlation coefficients were 0.9752 (F2), 0.9965 (F3), 0.9987 (F4), 0.9996 (F5), 0.9998 (F6).

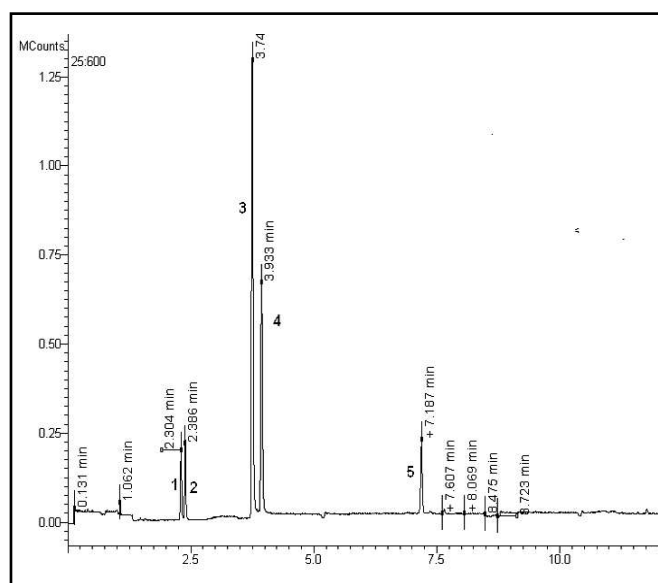


Figure 1

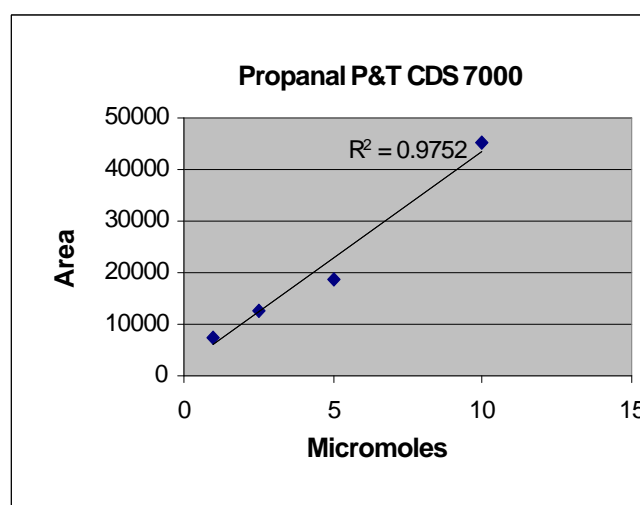


Figure 2

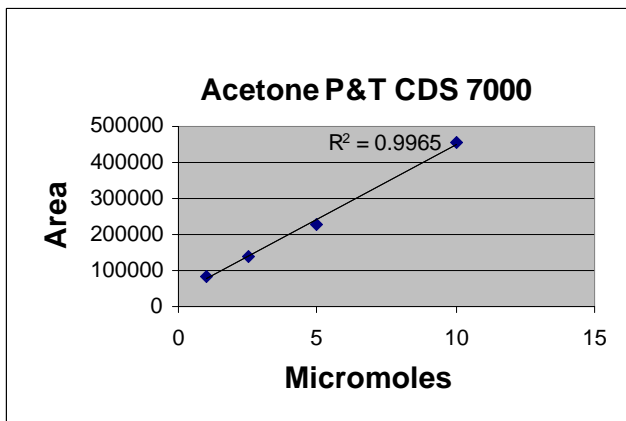


Figure 3

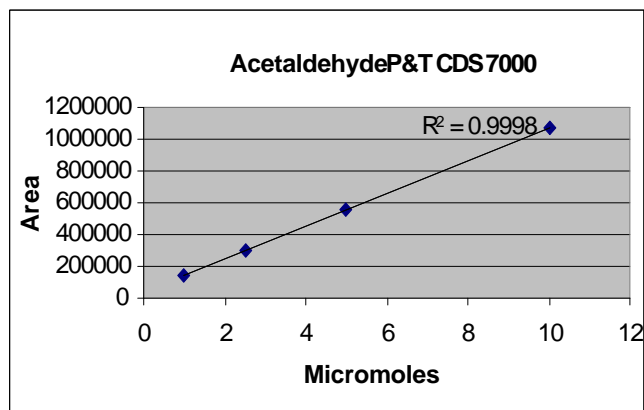


Figure 6

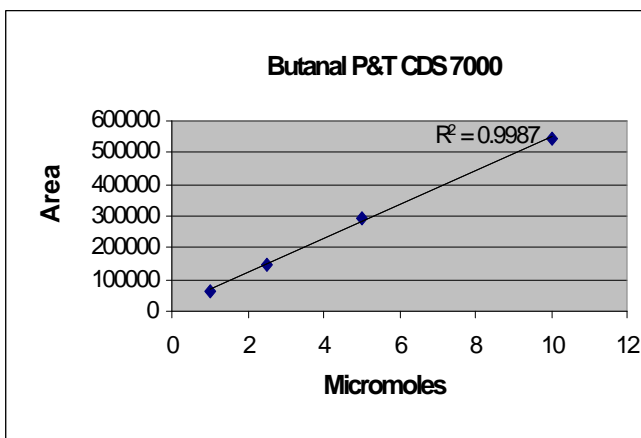


Figure 4

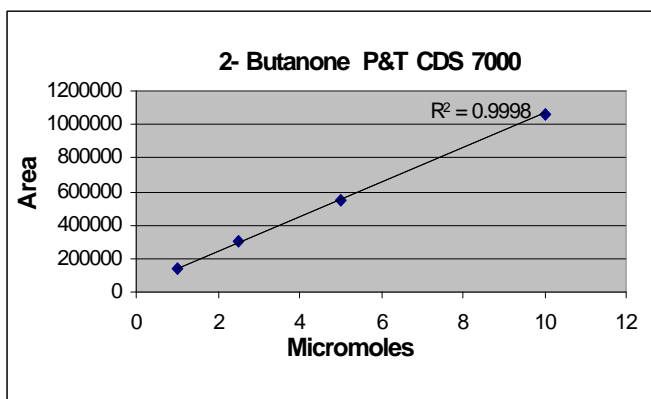


Figure 5

CDS 7000 Parameters

Valve Oven: 150°C
 Transfer Line: 150°C
 Purge Ready: 40°C 10ml/min
 Dry Purge: 35°C 2.0/min 200ml/min
 Desorb Preheat: 245°C 0.0/min
 Trap Desorb: 250°C 4.0/min 250ml/min
 Trap Bake: 260°C 10.0/min 400ml/min

GC Time: 15.5/min 10ml/min

GC/MS Parameters

Column: Varian CP 624 30m , 0.25mm , 1.4µm
 Flow Rate: 1.3ml/min
 Split Ratio: 20:1
 Program: 40°C/2min
 Ramp 10°C/min
 Final: 175
 MS: Varian Ion Trap

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