

## TDAS 2000 UPGRADE Your PAL

### Application Note T401e

#### TDAS 2000 Direct Thermal Extraction Applications

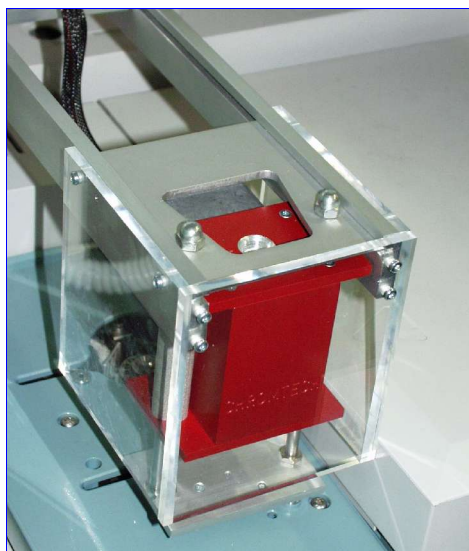
The **CHROMTECH TDAS 2000** thermal desorption unit in combination with a CTC Combi PAL autosampler enables automated operation of up to 296 sample tubes. Volatiles and Semi-volatiles can be analyzed either by desorption from adsorbent filled tubes (e.g. Tenax TA®, Carboxen®, Carbotrap®, etc.) or by direct thermal extraction from solid samples.

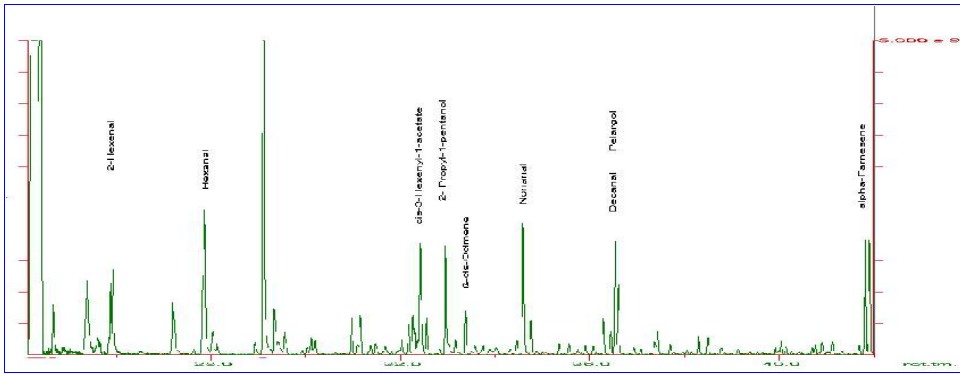
This technique permits the direct analysis of solid samples without the need for any time and/or solvent consuming sample preparation techniques.

For the direct thermal extraction, the solid sample (sample weight 1 – 500 mg) is placed inside the TDAS tube, preferably between two plugs of deactivated (silanized) glass wool. The tube is then

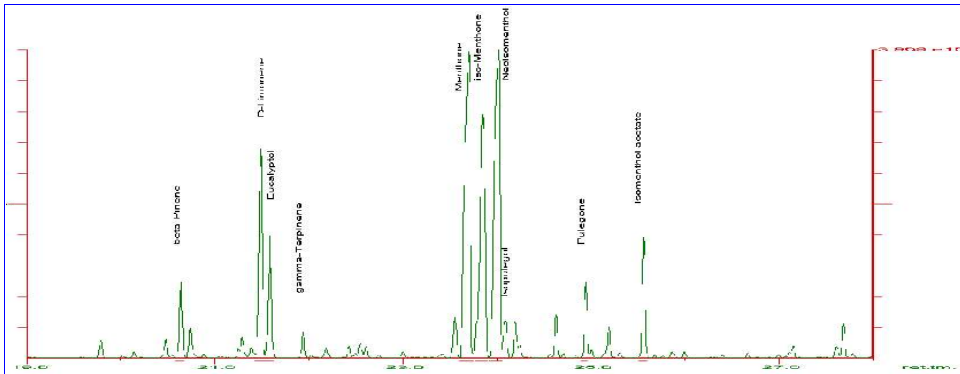
crimp-capped with inert PTFE plugs at both ends. Hence, all following operational steps are automatically carried out by the CTC Combi PAL. The tube containing the solid sample is pre-flushed (purged) with a stream of inert gas (e.g. Helium) to remove the air (Oxygen) before the thermal extraction takes place in the TDAS oven. The sample tubes are then transported into the oven. While the pre-heated oven is pushed downward, the injector needle which is mounted to the bottom of the oven, penetrates the septum of the PTV injector. The carrier gas flow is thus conducted through the sample tube into the injector.

The thermally desorbed/extracted analytes are cryofocussed inside the cooled PTV injector liner (liquid N<sub>2</sub> or liquid CO<sub>2</sub>). After completing the thermal extraction, the carrier gas is switched back directly into the GC injector via the EPC of the GC. The PTV injector is instantly heated, and the compounds of interest are transferred onto the GC column where the chromatographic separation takes place. The technique described above is ideally suited for a wide variety of solid samples, for example pharmaceuticals, food products, tobacco products, natural products, building materials and packaging products. By selecting appropriate TDAS parameters (e.g. desorption temperature, desorption time) it is possible to control the number of extracted compounds as well as the molecular weight distribution.

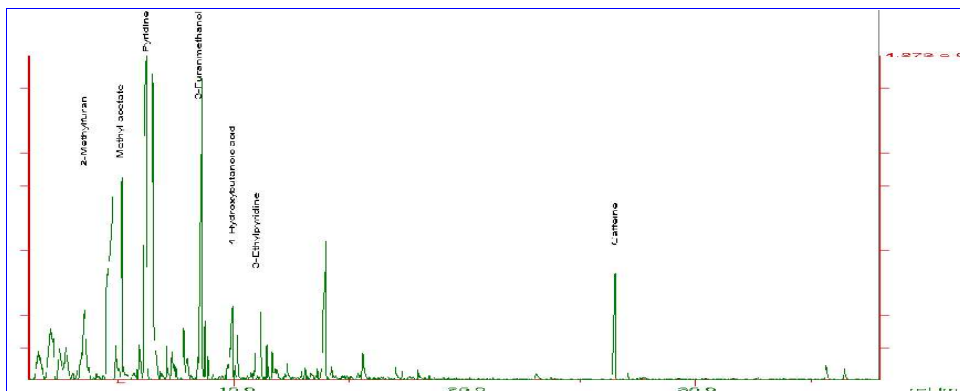




Technique: Direct Thermal Extraction of Solid Samples  
 Sample: 10µL Cold-pressed native Olive Oil from Tuscany, on silanized glass-wool inside the TDAS sample tube  
 Thermal Desorption: Desorption Temperature: 150°C, Desorption Time: 20 min  
 VentFlow: 50 mL/min, PTV Initial Temperature: -40°C  
 Column: DB-5MS, 30m x 0.25mm ID x 1.0 µm film, 30°C to 320°C@10°C/min  
 MS: Scan: m/z 35-400



Technique: Direct Thermal Extraction of Solid Samples  
 Sample: ca. 8 mg Wrigley's® Extra Green Mint chewing gum was placed inside the TDAS sample tube  
 Thermal Desorption: Desorption Temperature: 100°C, Desorption Time: 10 min  
 VentFlow: 50 mL/min, PTV Initial Temperature: -40°C  
 Column: DB-5MS, 30m x 0.25mm ID x 1.0 µm film, 30°C to 320°C@10°C/min  
 MS: Scan: m/z 35-400



Technique: Direct Thermal Extraction of Solid Samples  
 Sample: ca. 3mg of a crushed coffee bean was placed inside the TDAS sample tube  
 Thermal Desorption: Desorption Temperature: 250°C, Desorption Time: 6 min  
 VentFlow: 50 mL/min, PTV Initial Temperature: -40°C  
 Column: DB-5MS, 30m x 0.25mm ID x 1.0 µm film, 30°C to 320°C@10°C/min  
 MS: Scan: m/z 35-400