

# CDSolutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

## Pyrolysis and Reactant Gas Pyrolysis GC/MS to Detect and Study Antimicrobial Agents

Triclosan is an antimicrobial agent commonly used in many hygiene products, like toothpaste and liquid soap. Its overuse may contribute to antibiotic resistance, and there are growing concerns about its safety. It can be absorbed through the mouth and skin, has been found in human urine, and studies have shown that it can alter hormone regulation in animals. What we use in the sink and shower goes down the drain and ends up at a sewage treatment plant, whose effluent may enter a stream, and end up back in our water supply.

Pyrolysis GC/MS can be used to extract and detect triclosan in materials without lengthy sample preparation. When a small sample is pyrolyzed, triclosan is easily detected in antibacterial hand soap (Figure 1). It can also be easily spotted in other matrices, like sewage sludge. Approximately 2mg sewage sludge spiked with triclosan was pyrolyzed at 750°C. We can not only see the composition of sludge, but can also detect triclosan when we extract ion 290. If pyrolysis products of the sludge are not of interest, a lower temperature of 300°C, may be used to desorb triclosan leaving polymeric materials behind.

To study how triclosan combusts, reactant gas studies can also be done (Figure 3). Triclosan, and sewage sludge with triclosan was pyrolyzed in air at 5°C per minute. Under these conditions, dichlorodibenzodioxin is present in larger amounts.

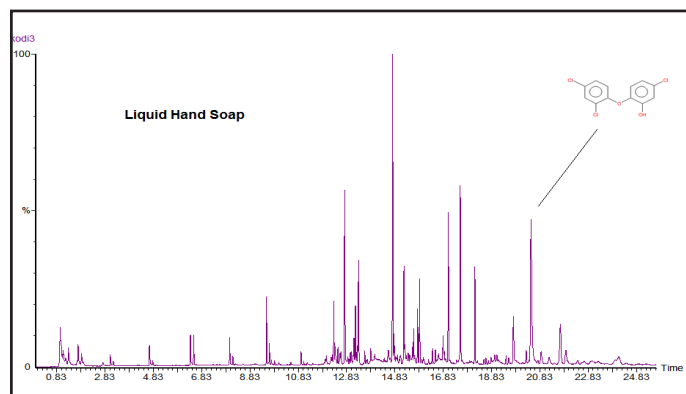


Figure 1: Liquid Hand Soap 750°C.

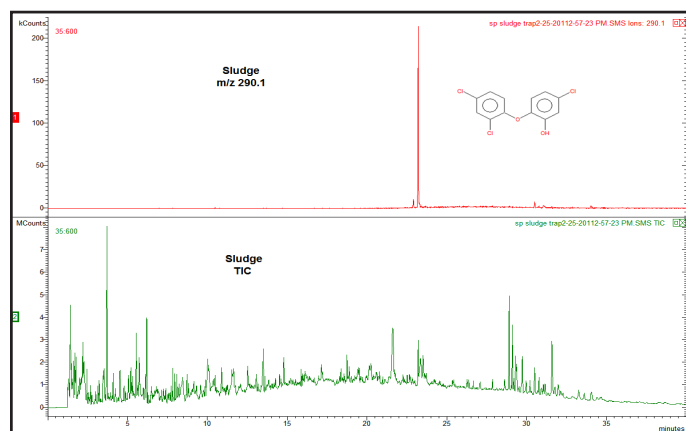


Figure 2: Sewage Sludge with Triclosan 750°C.

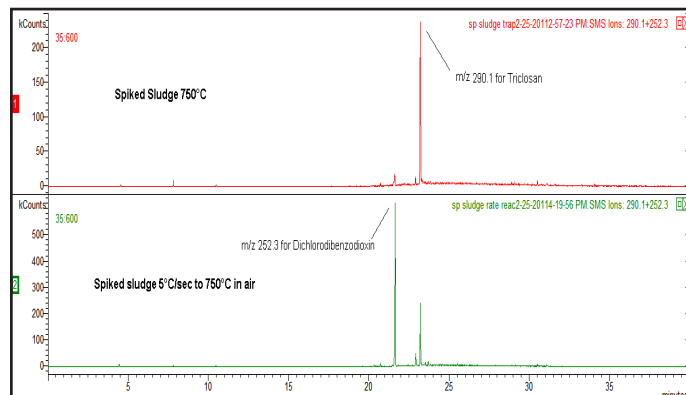


Figure 3: Sewage Sludge in air 750°C.

## Equipment

These samples were analyzed using a CDS Model 5200, interfaced to a GC/MS.

### Model 5200 Conditions

Valve Oven: 325°C  
Transfer Line: 325°C  
Temperature: 750°  
Time: 15 seconds  
Interface Final: 325°C for 3 minutes

### Model 5200 Conditions Reactant Gas

Valve Oven: 325°C  
Transfer Line: 325°C  
Temperature: 5°C/min to 750°  
Interface Final: 325°C for 5 minutes  
Trap Final: 325°C for 5 minutes  
Reactant Gas: air

### GC Conditions

Carrier: Helium  
Injector: 325°C  
Split: 50:1  
Column: 5% Phenyl (30m X 0.25mm)  
Detector: Ion Trap or Quadrupole  
Range: 35 - 550amu

### GC Program:

Initial: 40°C for 2 minutes  
Ramp: 8°C/min.  
Final: 300°C for 5 minutes

FOR MORE INFORMATION  
CONCERNING THIS APPLICATION,  
WE RECOMMEND THE  
FOLLOWING READING:

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 5000, 5150, 5200 and 5250 autosampler 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 purge & trap instruments for drinking and waste water. CDS also manufactures the Dynatherm line of thermal desorption instruments including the 9300 series for air monitoring and the 7500 autosampler. 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, call us at 1 800 541 6593, or log onto [www.cdsanalytical.com](http://www.cdsanalytical.com).