

## Application Note

### Biochemical

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Biosystem components, such as DNA, do not normally lend themselves to thermal analysis. Matrix complexity as well as lack of volatility would seemingly rule out pyrolysis-GC/MS as the method of choice. However, work has been done that clearly shows thermal analysis can be applied successfully to a biosystem component like DNA.

Pyrolysis is a technique that thermally fragments compounds and liberates volatile organic materials from a matrix that is relatively non-volatile. Sample analysis amounts are <100 mcg. The volatiles are then separated by gas chromatography and identified by use of a mass selective detector in conjunction with a database library like Wiley or Nist.

Figure 1 shows the total ion chromatogram of the sugar deoxyribose which is present in the deoxyribonucleic acid. A well resolved biomarker compound for this appears to be the heterocyclic alcohol, 2-Furanmethanol, occurring at about 7.2 minutes. A sample of DNA was likewise thermally treated and the various ion chromatogram peaks were examined. Figure 2 shows a prominent peak of 2-Furanmethanol.

Clearly, pyrolysis as applied to selected biosystem components is a novel way of using thermal analysis. It can be used to obtain both quantitative as well as qualitative data.

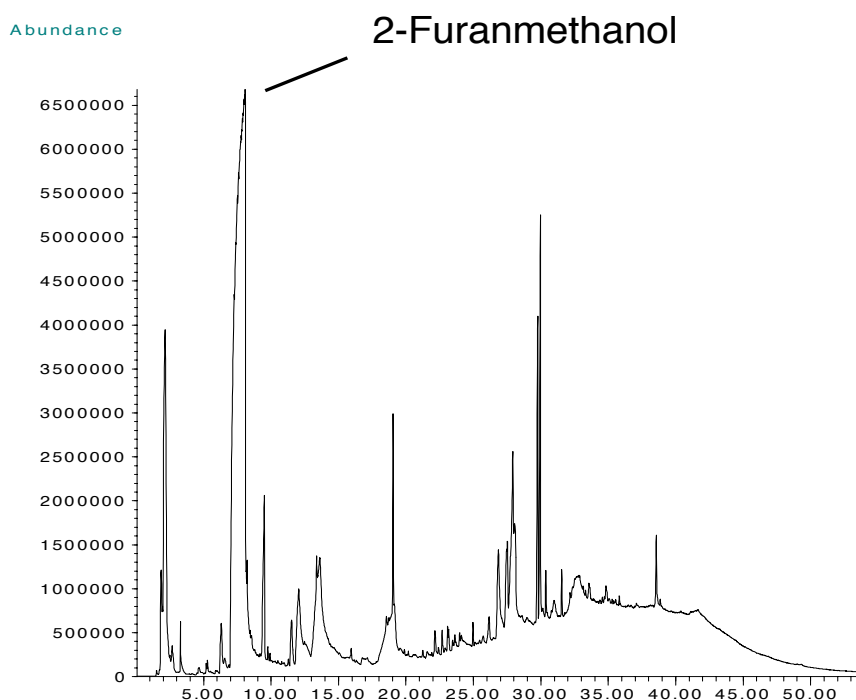


Figure 1. DeoxyRibose at 700°C.

## Instrument Conditions

### Pyroprobe Autosampler

Valve Oven: 300°C  
Temperature: 400°C  
Time: 10 seconds

### GC/MS

Column: 5% phenyl (30m x 0.25mm x .25µm)  
Carrier: Helium, 10:1 split  
Injector: 300°C  
Oven: 40°C for 2 minutes  
6°C/min to 295°C hold 10 min

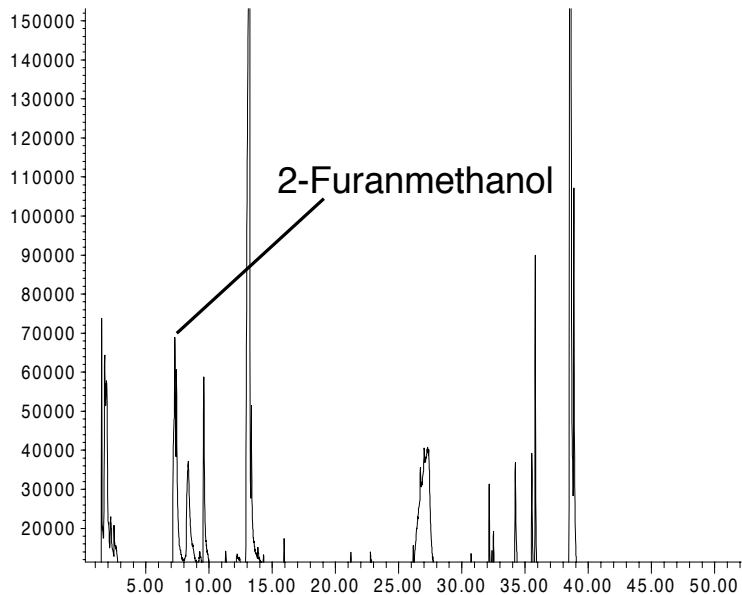


Figure 2. DNA

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

Larry Eudy et al., Gas Chromatography-Mass Spectrometry Studies On The Occurrence Of Acetamide, Propionamide, and Furfuryl Alcohol in Pyrolyzates of Bacteria, Bacterial Fractions and Model Compounds,  
Journal of Analytical and Applied Pyrolysis, 7 (1985) 231-247.