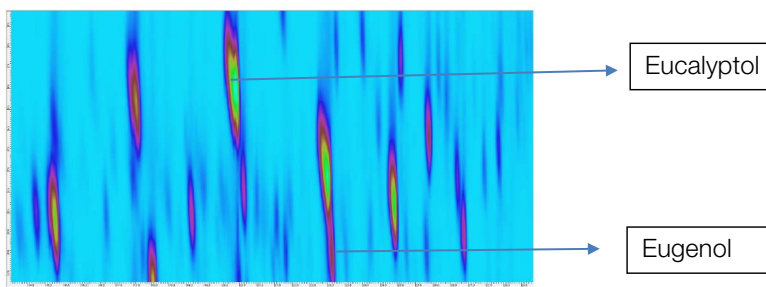
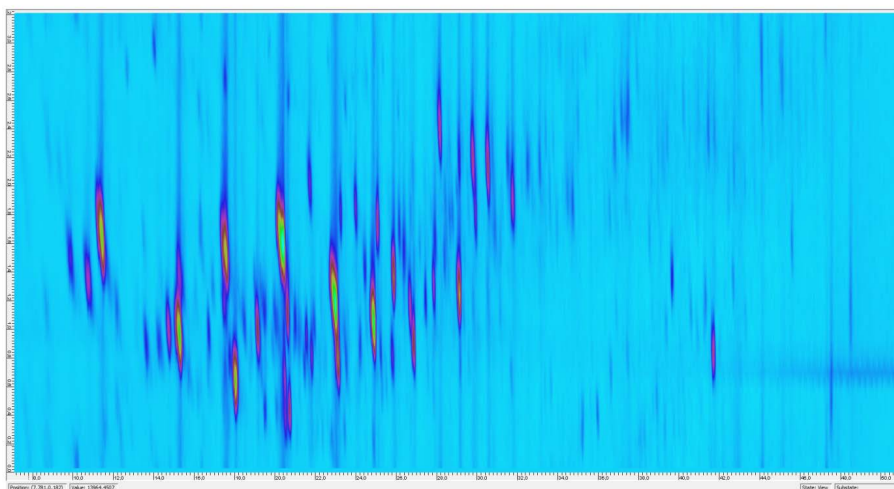


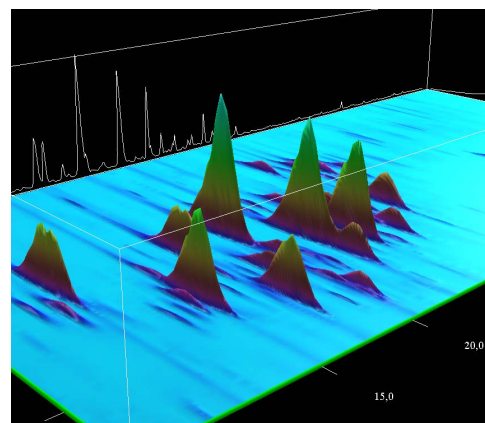
## Pyrolysis Oil of Spruce Lignin with GCXGC FID/MSD<sup>®</sup>

Author Application Note: Mark van Lieshout, 2015

In the research of renewable fuels, wood is considered to be one of the most promising material for such energy sources. Especially in the Nordic countries, where this material is widely available. In this application Spruce lignin is the material for investigation. The raw lignin fibers are rapidly heated up to 500°C under a continuous nitrogen flow. The volatile gas phase, methane/ethane is collected. Other less volatile gases are directly condensates and collected. The result is a pyrolysis oil. This oil is injected into an Agilent 7890 GC with FID detector as well as a MSD. The complexity of such sample shows that the used GCXGC technology is really the best choice for optimal separation of all the compounds. These compounds range from aliphatic to more polar phenol-like compounds. Typical compounds like Eucalyptol and Eugenol are also found.



Enlargement of details of the 2D plot



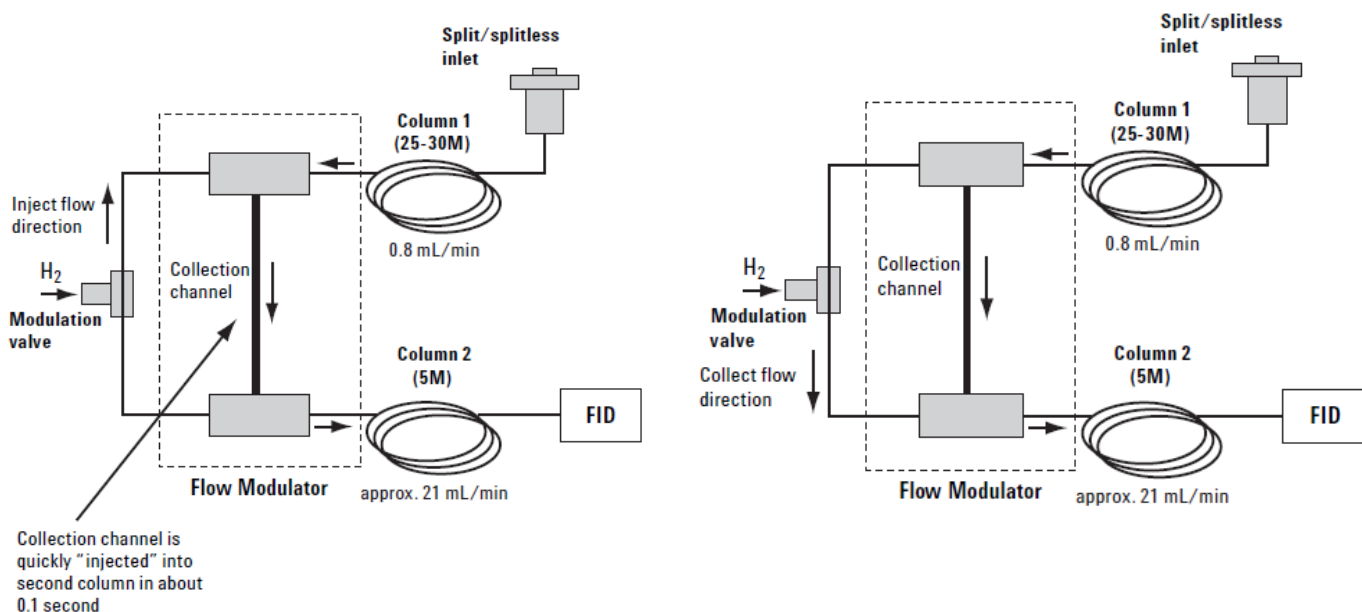
3D view of Spruce lignin Pyrolysis!

Instrument used: Agilent GC 7890 GC equipped with an FID and 5877 MSD.

The modulator is the Capillary Flow Modulator, CFT with a Np column set, non-polar in the first dimension and mid-polar in the second dimension. The CFT is using no mechanical valve in the sample flow line, but needs a high outlet flow to ensure a rapid transfer from the first dimension column to the second column. For the correct interface between the Flow modulation and the MSD, a 1:10 splitter is installed. The split flow is directed into the FID.



Agilent GC 7890 GC equipped with an FID and 5877 MSD.



ZOEX Europe is supplier of Comprehensive Solutions on the Agilent GC – and MS platform.

*Acknowledgement: Samples were provided and run by Roman Tschentscher, Sintef Materials & Chemistry, Oslo Norway.*