Application Note No. 071

The Analysis of Acid Herbicides by RLVI/GC/MS

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Introduction

Acid herbicides were first introduced as weedkillers in the 1940s. They are applied as esters or salts, as they are readily metabolised in this form, to the top of the soil or grass, regulating the growth of mainly broadleaf weeds. They readily degrade in the environment, however the esters are oil soluble and form emulsions in water, whereas the salts are highly soluble in water, therefore the leaching of the acid herbicides into the groundwater causing contamination is of major concern.

The analysis of acid herbicides using large volume injection enables detection limits to be more easily reached, and therefore sample preparation to be reduced. A method for the large volume injection using the Optic is presented, along with some performance data.

Instrumentation and Conditions

- ATAS Optic 2-200 programmable injector
- Varian Star GC/MS

Optic Conditions

Injection volume: 100 µL
Solvent type: iso-Octane
Liner: ATAS ‘A’ Type
Mode: Large Volume
Gas Flows: Split: 50 ml/min, Vent: 150 ml/min
Initial temperature: 55 °C
Vent time: 0:35 m:s
Ramp rate: 4 °C/s
Final temperature: 280 °C
End time: 16 mins
Split open time: 3 mins
Purge pressure: 7.5 psi
Transfer pressure: 10 psi
Transfer time: 0 mins
Initial pressure: 10 psi
Final pressure: 19.7 psi

GC conditions:
Column: HP5-MS 30m x 0.25 mm i.d. x 0.25 µm film
Initial Temperature: 90 °C
Ramp Rate: 18 °C/min
Final Temperature: 260°C (8 mins)

MS conditions:
Mode: EI Scan
Mass range: 50-560 m/z
Scan time: 0.500
Segment length: 16 mins
Fil./Mul. Delay: 7.50 mins

Chromatogram

Figure: TIC trace of 100 µL injection of pentafluorobenzylated acid herbicides
The 'A' Type liner is suitable for the large volume analysis of acid herbicides, as a means of increasing the injection volume thereby reducing detection limits and decreasing the sample size and preparation.

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