

Large Volume Injection for Capillary Gas Chromatography Using new PTV Injector with a Liner in the Shape of a Stomach

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[Introduction] We have developed new PTV injector for capillary gas chromatography with “stomach” shaped liner inserted in it. At beginning, injection temperature is kept just below the boiling point of the solvent, and injected sample can stay in the liner as liquid. This unique “stomach” shaped liner has brought many advantages for large volume injection.



Fig. 1 “Stomach” shaped liner

[Large Volume Injection method]

1st stage; The injector is kept at a temperature lower than the boiling point of sample solvent. Sample is injected into the liner, and stays there as liquid state.

2nd stage; While the evaporated sample solvent is exhausted in the split purge mode, the target compounds are concentrated in the liner.

3rd stage; Target compounds are transferred to the capillary column at an elevated injector temperature in the splitless mode.

4th stage; Matrix compounds are eliminated from the liner in the split purge at further elevated injector temperature.

[Results and Discussion]

We have studied the performance of large volume injection of this injector. We have used, as sample, n-hydrocarbons, PAHs, PCBs and pesticides. Good linearity has been obtained between each peak area of n-hydrocarbons (n-C12-C30) and its injection volume (i.e. 10, 20, 30, 40, 50 μ L). Sample of 50 μ L volume was injected and analyzed repeatedly (n=7). We have got good repeatability of 2% or less RSD (Relative Standard Deviation) on each n-hydrocarbon peak area.

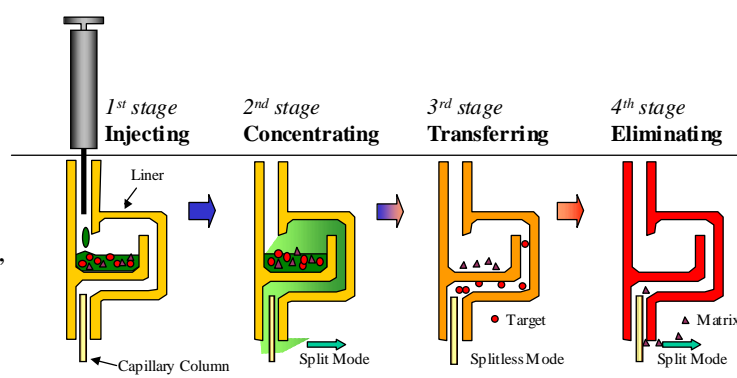


Fig. 2 Scheme of large volume injection method

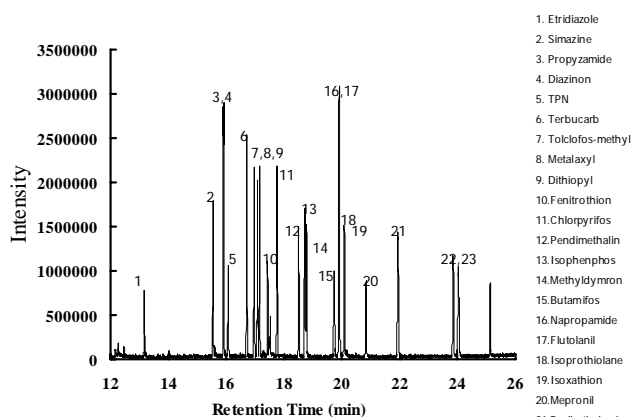


Fig.3 SCAN chromatogram obtained by injecting **40 μ L** (LVI) of pesticides **in Acetone**

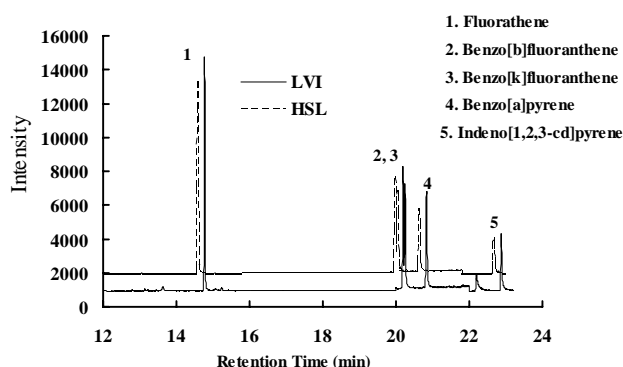


Fig. 4 Total ion chromatogram obtained by injecting **200 μ L** (LVI) of PAHs in hexane (**0.1pg/ μ L**) and **2 μ L** (HSL) of PAHs in hexane (**10pg/ μ L**)