Solution for falling MSD response in P&T/GC/MS methods

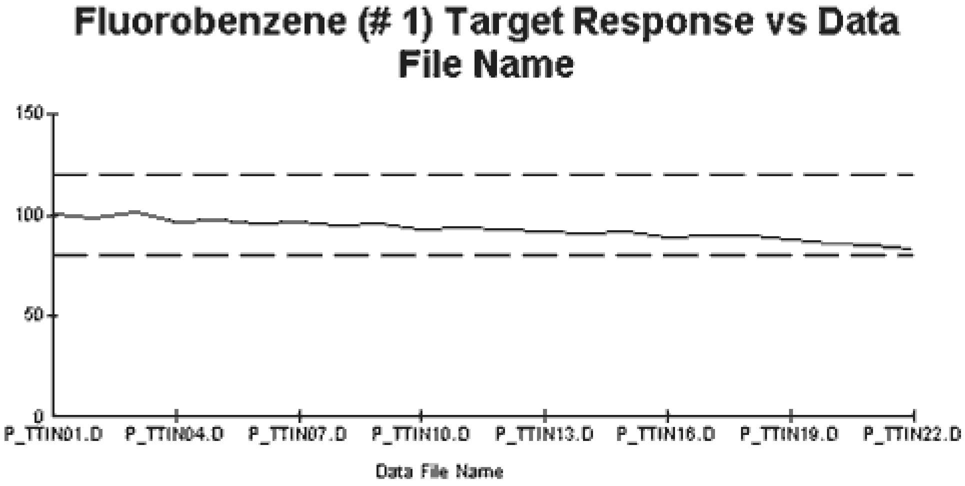
You need a consistent response from all compounds over the course of several days, weeks, or even months to ensure the longevity of any calibration. But some technicians have observed a fall off in response over time that can jeopardize these calibrations.

When internal standard or surrogate responses fall off with repeated injections, it may be caused by overloading the Agilent 5973 MSD's high-energy dynode (HED) electron multiplier (EM).

Many GC/MS users erroneously believe that they can increase the sensitivity of their MSD by increasing the EM voltage. This can be done either by raising the target value during tuning or by adding voltage to the tune value in the "MS SIM/Scan Parameters" window. However, in the electron impact mode, the noise increases at approximately the same rate as the signal. So, the true sensitivity – signal to noise ratio – does not increase.

Instead, the main consequence of increasing the EM voltage is the reduction of the electron multiplier's lifetime. This can show up as a reduced response over time (Figure 1), and it may even be noticeable after only a few runs.

Figure 1. *Repeat P&T injections of fluorobenzene show a gradual decrease in MSD response due to electron multiplier overloading. Reducing the EM voltage cures this problem*



The solution to this problem is simple. First, reduce the electron multiplier voltage. This will reduce the signal and noise, but not the signal to noise ratio. Then reduce the threshold value in the “Edit Scan Parameters” window. This will allow you to see the smaller ions. The default EM voltage values from an Autotune are usually correct, but these can be decreased slightly if the above-mentioned symptoms occur.

To research much more information on the optimization of purge and trap/GC/MS methods, download Application Note number 5989-0603EN.