

Reduction of solvent consumption in HPLC

With the past shortage of Acetonitrile, the consequent increase in its price has had a significant impact on the cost of each HPLC analysis and with increasing costs of solvent discharge, users have to consider ways to save on solvent consumption.

Below, we share some suggestions for achieving this:

1. Reduce the column internal diameter: by reducing the diameter of an HPLC column from 4.6 mm to 3.0 mm, a reduction of almost 60% in eluent consumption is obtained (flow rate = $(3.0 / 4.6)^2 = 0.43$), maintaining the same selectivity, resolution and analysis time.
2. Reduce the column length and particle size: reducing the length from 250 mm to 150 mm and decreasing the particle size from 5 μm to 3 μm , it is possible to obtain the same resolution and a reduction of about 40% (length ratio = $150/250 = 0.6$) in the analysis time, proportionally reducing the consumption of solvents. Even greater gain can be obtained by also reducing the internal diameter, as indicated above.
3. Use another organic modifier: despite the expected change in selectivity, replacing acetonitrile with methanol or ethanol allows to reduce the cost of analysis (there is, however, the possibility of increasing pressure, due to the effect of intermolecular interactions and higher density mixtures to certain proportions).
4. Use a solvent recycler: it is an effective solution for isocratic separations, allowing savings over 80%.