



WHY SFC IS THE FASTEST GROWING GREEN PURIFICATION TECHNIQUE

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The pharmaceutical industry has shifted the paradigm of drug selection to require enantiopure formulations. In turn, the development of chiral stationary phases (CSPs) have enable chromatographers to resolve racemic mixtures with increasing efficiency. Enantioselective liquid chromatography (LC) is recognized as a useful tool for the preparative isolation of stereoisomers across the spectrum of scales. However, chiral LC is a major consumer of resources, such as, time and organic solvents.

An attractive alternative to chiral LC is a closely related technology, that employs carbon dioxide as the bulk of the mobile phase, Supercritical Fluid Chromatography (SFC). SFC has extended the application of chiral chromatography as a means to resolve and/or isolate enantiomers by its highly tunable nature. The parameters of pressure and temperature in combinations with CSP and strong solvent selection can dynamically effect the resultant resolution. Supercritical CO₂ also demonstrates lower viscosities than traditional HPLC mobile phases, thereby enabling geometric scalability from the analytical to the full spectrum of the preparative scale.

Analytical SFC instruments perform about 5 times more analyses per year than HPLC instruments, require fewer columns (less wear) and little solvent disposal time. The preparative instruments maintain a return on investment of one year due to the USD 200,000 saved in solvent cost, labor (FTE), dry-down costs, energy and solvent disposal.

The presentation will show that despite the higher capital costs, this green technique currently saves every major pharmaceutical company many green dollars.