



# Fraction Collection and Simultaneous Concentration for Chiral Purifications Using Supercritical Fluid Chromatography (SFC)

Herbert J. Hedberg, Modular SFC, Inc.

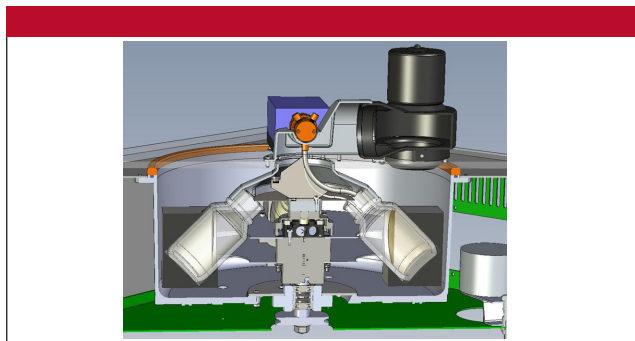
A novel centrifugal fraction collector enables SFC users to simultaneously collect and concentrate fractions. The technique is particularly useful for chiral separations where large volumes of enantiomers are being purified by stacked injection methods.

SFC has proven particularly useful in drug discovery for providing pure enantiomers in support of scale-up synthesis. In most cases collected materials must be dried and concentrated before moving to the next step. Productivity can be significantly increased if the two serial processes of collection and concentration could be combined to occur simultaneously.

Modular SFC has developed a novel, centrifugal fraction collector capable of collecting large volume fractions and simultaneously concentrating the fractions in the collection containers. Because the concentration process occurs simultaneously with the fractionation activity, the instrument significantly speeds the overall process from injection to dry pure compound.

## Technology

Modular SFC's CFC-2™ Chiral Centrifugal Fraction Collection System operates at atmospheric pressure and can accommodate four 250 mL glass containers\* to collect fractions.



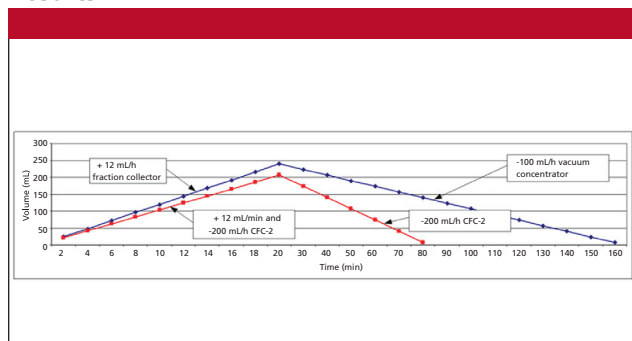
**Figure 1:** The cross section diagram shows how the high volume Centri-Fan™ recirculates rotor chamber gas at high velocity across the surfaces of the collected liquid. Centrifugal force assures maximum fraction yields at high CO<sub>2</sub> and blow-down gas flow rates.

A rotor containing the collection bottles spins at 1,500 rpm (concentrator speed). Flexible tubing is redirectable to each fraction while the rotor continues to spin. The centrifugal force causes the highest density components (liquids and solids) to accumulate in the bottom of the bottles while the expanded gaseous components spill into the confines of the rotor chamber.

The Centri-Fan (patent pending) recirculates room temperature rotor chamber gas into each media bottle at 50 cfm while

the rotor spins and fractions are being collected. The centrifugal force assures high fraction recovery despite the aggressive blow-down gas flow rate.

## Results



**Figure 2:** The graph shows processing times for a 20-min method at 50 g/min CO<sub>2</sub>:MeOH at 75:25 with a standard fraction collector and vacuum concentration device vs. a CFC-2 collector/concentrator. Preparation of pure dry compound in this example is finished in half the time using the CFC-2.

## Conclusion

The CFC-2 Chiral Centrifugal Fraction Collector with simultaneous concentration capability combines typically serial process steps to speed overall process time. The centrifuge-like aspects of the instrument make it especially effective at recovering sample from SFC eluant flows; however, even HPLC-based methods will benefit from the productivity gains provided by simultaneous concentration.

\*Various rotors for the CFC-2 Fraction Collector can accommodate 24 × 20mm × 150mm glass tubes; 4 × 250mL media bottles; 4 or 8 × 100mL round evaporator flasks; 4 or 8 × 20mL or 40mL scintillation vials.

## References

- Berger T, Smith J., Fogelman, K., Kruluts K. *American Clinical Laboratory* 2002: October.
- Wu DR, "Chiral Supercritical Fluid Chromatography in Drug Discovery: from Analytical to Multigram-Scale," presented at the 2007 SFC Conference, August 31– September 3, 2007, Dallas, Texas.

**Modular SFC, Inc.**

167 S. Washington St.,

North Attleboro, MA 02760-2235

Tel: (508) 479-1161; Fax: (508) 695-1958

Email: info@modularsfc.com

www.modularsfc.com