

Cannabinoid Isolation Models Utilizing Immobilized Chiral Stationary Phases and SFC



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INTRODUCTION

In the cannabis and hemp industry, chromatography is often talked about as a potential method for the purification and isolation of desirable cannabinoids contained within the plant. But because of the cost of equipment and technical skill required to operate, it's rarely utilized.

The exception to this is the rise in liquid flash chromatography (FC) usage over the past few years. The reasons are simple: the cost of equipment is relatively low, and it promises high quality results with minimal effort. However, the purchaser quickly realizes that a large volume of flammable solvent is needed to run the system, and additional equipment is required to evaporate the solvent (which is often mixed with water) making evaporation a long and energy consuming process.

What will be shown in this poster is how supercritical fluid chromatography (SFC) can be used as both an analytical technique for quantitating cannabinoids, and a preparative technique for either isolating Cannabidiol (CBD) or removing Tetrahydrocannabinol (THC).

OBJECTIVES

- First, an analytical method utilizing's immobilized chiral stationary phase (CSP) **CHIRALPAK® IB N-5**, from DAICEL Corporation, will be presented to show its performance in resolving the current lot of cannabinoid standards
- Second, an additional analytical method utilizing **DCpak® P4VP**, an achiral stationary phase (SP) from DAICEL Corporation, will be presented, to demonstrate its performance in resolving the lot of cannabinoid standards
- Third and final, the two stationary phases were used in a preparative method, and purification results of real-world sample injections will be presented along with scale up calculations. These results provide an alternative to flash chromatography, and present a more efficient and greener solution

CHIRALPAK® IB N-5 Analytical SFC Method Development

There are two types of CSPs: coated and immobilized. Coated phases are weakly attached to their silica substrates, and when subjected to improper conditions, this phase can be stripped away. This will cause the retention and peak shape of the cannabinoids to degrade to the point of unresolved peaks and difficult quantitation.

It is for this reason that the DAICEL catalog of immobilized CSPs was screened. DAICEL **CHIRALPAK® IB N-5** ultimately yielded the best combination of selectivity, peak shape, and resolution of the key cannabinoids.

Below, the three chromatograms show:

