TELEDYNE | LABS

Separation of Low Polar Compounds on the Combi*Flash* NextGen

keywords: CombiFlash NextGen, natural products, polarity

Manual chromatography for low polar compound separation requires sophisticated solvent preparation and hands-on time, resulting in labor-intensive work. Compared with conventional chromatography, automated chromatography offers precise control of flow rates and solvent gradients, resulting in more consistent and reproducible separations. Automation also significantly reduces hands-on time, allows multi-tasking while the auto-system runs independently, and minimizes solvent consumption through optimized protocols, making the results cost-effective and eco-friendly.

Low polar natural products include sterols, lipids, waxes, fats and oils, and so forth. The level of polar compounds is a good indicator of the quality of edible oils. Given the effect of oil quality on our everyday life, there are several testing protocols established worldwide. For example, ISO8420-2002 involves manual chromatography, while GB5009.202-2016 engages automated chromatography.

This note demonstrates the use of the CombiFlash NextGen, an automated chromatography system, for low polar compound separation, and the results are comparable (ISO8420-2002 vs. GB5009.202-2016). The solvent inlet on the NextGen300 and NextGen300+ systems enables a customized binary gradient by selecting any two solvents from the four connected solvent tanks. This feature streamlines the solvent preparation process (Figure 1). Also, an integrated software enables real-time monitoring and easy data documentation, improving traceability and simplifying method development. Overall, automated chromatography enhances efficiency, accuracy, and scalability in purification workflows.

Lab Settings

Instrument: Teledyne Combi*Flash* NextGen300+

Column: Redi*Sep* Gold® Silica Gel Disposable Flash Column - 24 Gram

Flow Rate: 32 mL/min

Detector: UV at 200 nm

Gradient: Indicated by the blue line in the figure.

Sample: Extra virgin olive oil, 100% Arbequina olives.

Results

The figures below are the elution results of the same edible oil under different separation protocols using a Combi*Flash* NextGen 300+. For polar components, the addition of acetone expedited the elution (compare Figures 1 and 2). As for non-polar components elution, petroleum ether and hexane showed similar results (compare Figures 2 and 3). In summary, regardless of the constitution of solvent (various separation protocols), the Combi*Flash* NextGen300+, an automated chromatography system, is an effective tool for polar- and non-polar components separation.

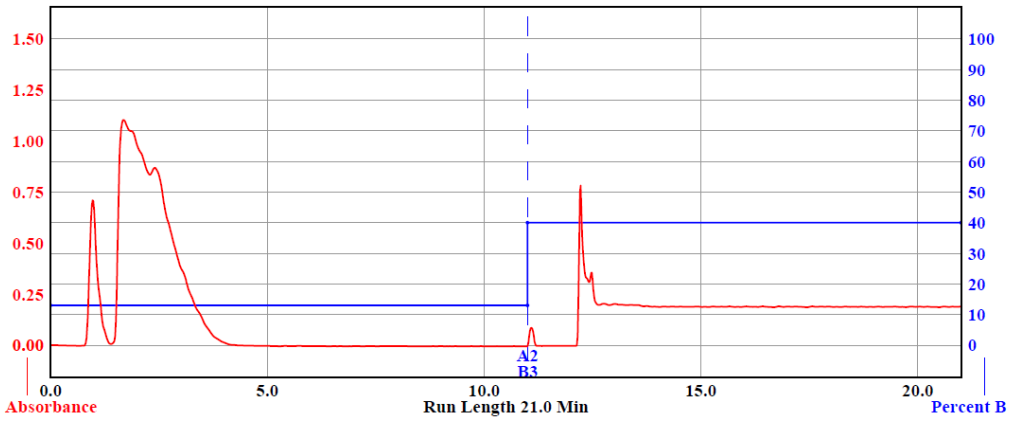

Figure 1. Per the China Food Safety Standard (GB. 5009.202-2016)
0–11 min: 13% diethyl ether in petroleum ether
11–21 min: 40% acetone in diethyl ether

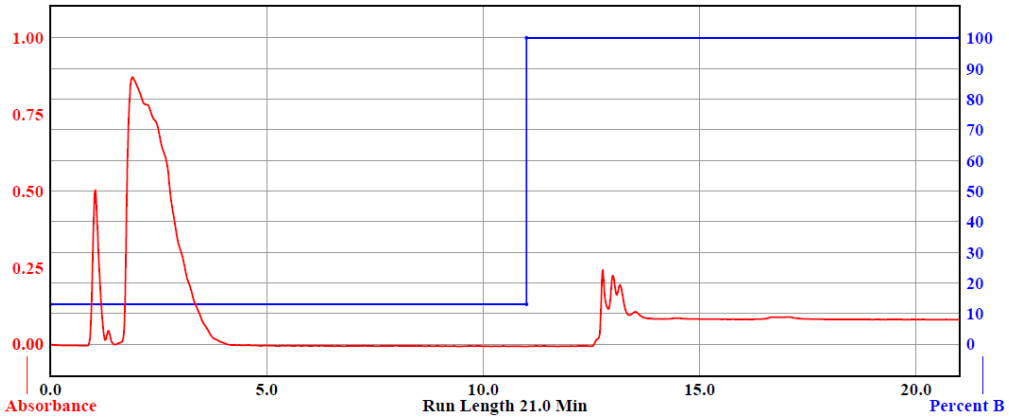

Figure 2. Per ISO8420-2002
0–11 min: 13% diethyl ether in petroleum ether
11–21 min: 100% diethyl ether

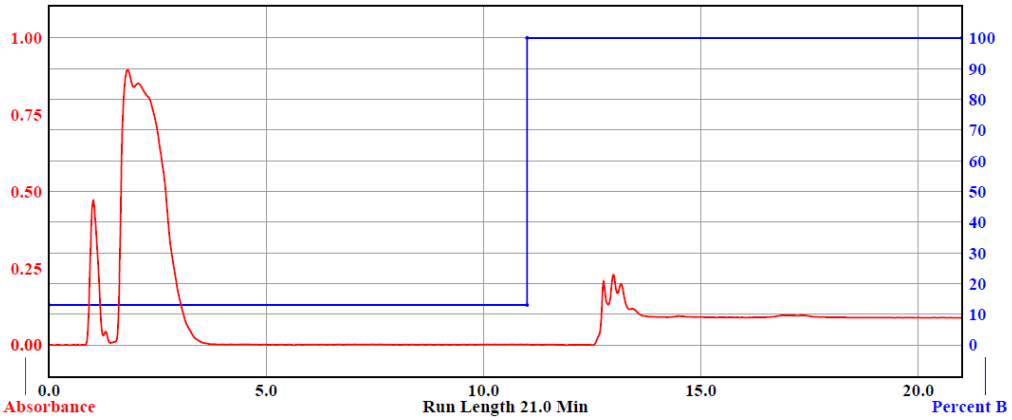

Figure 3. Customized solvent, replace petroleum ether with hexanes
0–11 min: 13% diethyl ether in hexanes
11–21 min: 100% diethyl ether