Analysis of Acylglycerols in Edible Oils by Gas Chromatography Using a Unique Stationary Phase

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Characterization of edible oils is essential to the food industry since adulteration is common, especially with expensive edible oils (e.g. Extra Virgin Olive Oil). Adulteration occurs when different vegetable oils (e.g., rapeseed, sunflower, etc.) are blended with higher quality olive oils to increase oil yields, which leads to higher profits. For these reasons, it is important to obtain a triacylglycerol (TAG) fingerprint of edible oils to verify authenticity. In addition, the freshness of oils can be determined by looking at the ratio of 1,2, 1,3-diacylglycerols (DAG). Using a unique and improved gas chromatography (GC) stationary phase minimizes bleed interference and retention time shifting, which improves the analysis of edible oils. The analysis and results for these oils will be presented along with examination of column bleed at high GC operating temperatures.

Abstract

Current 65-type phases are known to be problematic when fingerprinting edible oils. Different user pain points, when using these types of columns, include excess column bleed, poor inertness, poor resolution of TAGs, and shifting retention times over time due to poor thermal stability. The overall impact results in short column lifetime, the inability to do low level detection, and frequent detector maintenance.

Current Shortcomings

Typically, highly polar phases are difficult to coat and coat reproducibly. The new Rxi-65TG (30m x 0.25mm x 0.10µm) utilizes a modified polymer back bone to increase its thermal stability. With a new polymerization process that results in less column activity, the Rxi-65TG is much more inert than the existing columns on the market. The Rxi-65TG provides a better experience for analysts while maintaining the 65-type selectivity.

The Rxi-65TG

Edible Oil Fingerprints

High Temperature Stability

Bleed Comparison

Palm Oil

Extra Virgin Olive Oil

Cocoa Butter

Sunflower Oil

Edible Oil Fingerprints