

# THC and CBD in Cannabis-Infused Chocolate Edibles using Agilent Captiva EMR—Lipid Removal

## Authors

Christophe Deckers and  
Jean-François Roy  
Agilent Technologies, Inc.

## Abstract

Accurate measurement of  $\Delta$ 9-tetrahydrocannabinol ( $\Delta$ 9-THC) and cannabidiol (CBD) in samples with high fat content, such as chocolate, brownies, and cookies, is an important testing requirement to meet the evolving regulatory landscape for cannabis, where edibles are permitted under law. Chocolate is a complex matrix, rich in protein, fat, and cocoa, making it particularly challenging to analyze. This application brief emphasizes the simple sample preparation and minimized cost-per-sample. For more in depth information, please read the full application note, publication number 5994-2873EN.<sup>1</sup>

## Key advantages

- Fast sample preparation, resulting in increased sample throughput
- Optimized sample cleanup with a simple, yet effective, filtration step
- Accurate and precise THC and CBD quantitation
- Reduced HPLC maintenance and increased lab productivity

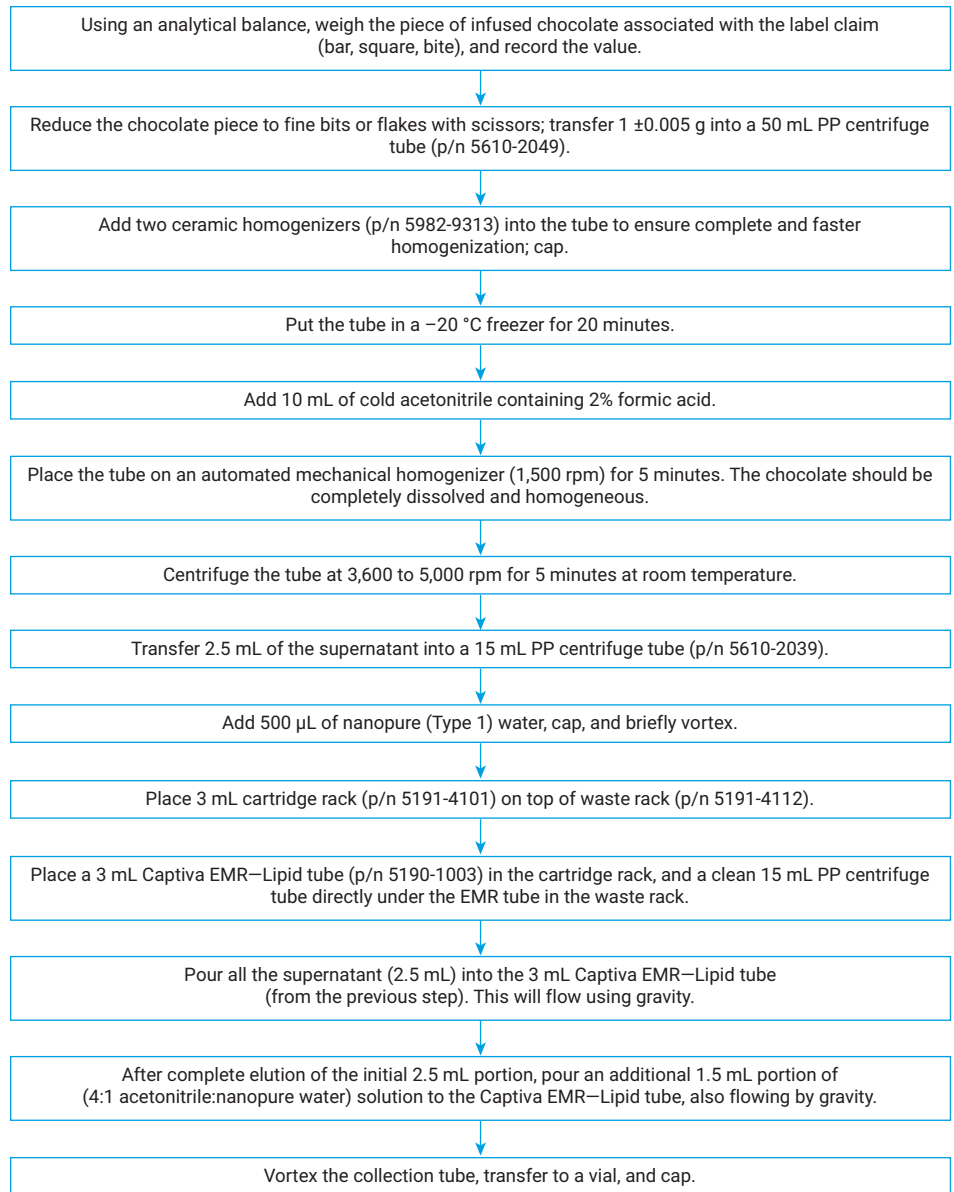


**Figure 1.** Milk chocolate chopped with scissors prior to weighing.

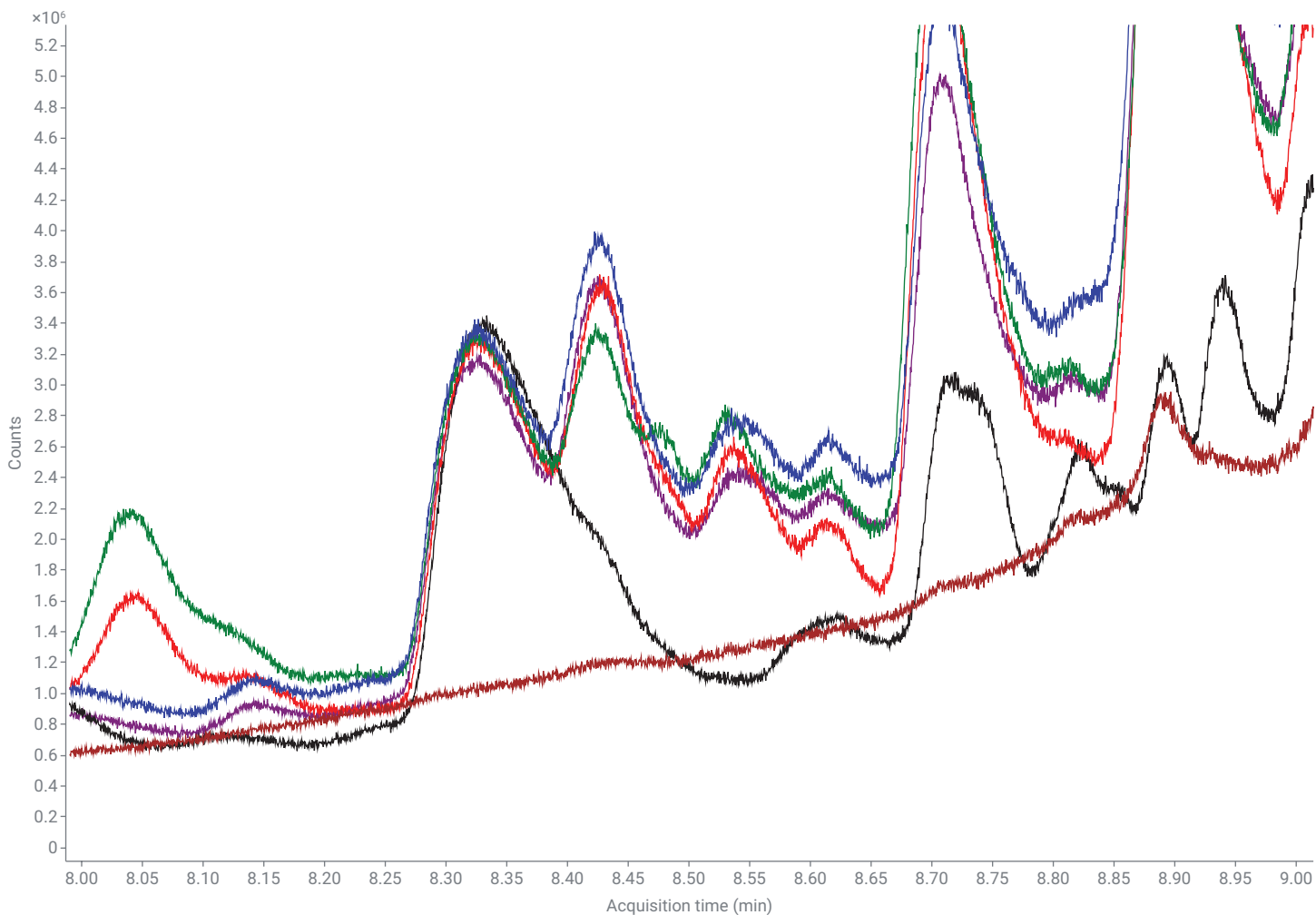
## Sample processing and cannabinoids extraction

Figure 2 shows the procedure. Lipid precipitation at cold temperatures or winterization does remove some lipids, but can also coprecipitate a significant quantity of cannabinoids, as shown in Figure 3.

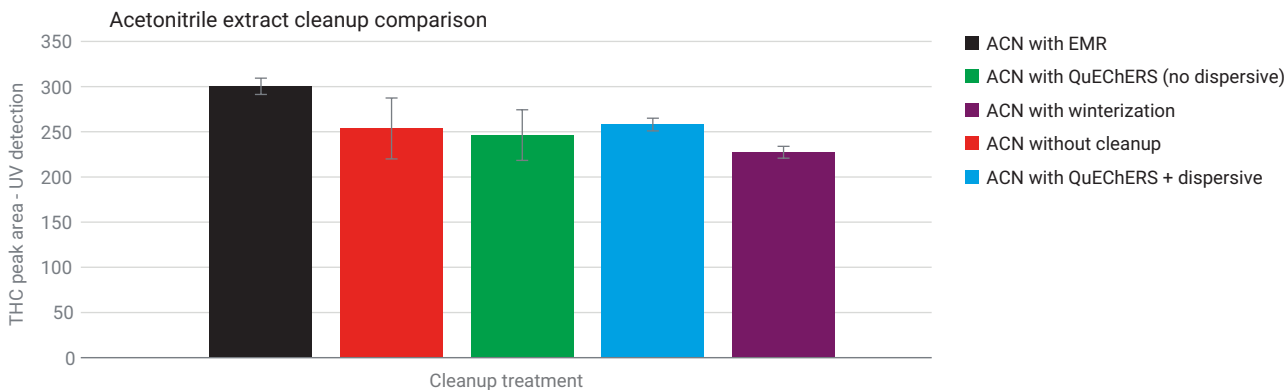
The LC/UV analysis of various cleanup techniques showed a significantly higher signal for THC when using a Captiva EMR–Lipid cleanup compared to other cleanup methodologies (Figure 4).



**Figure 2.** Sample processing and extraction procedure.



**Figure 3.** Zoomed in region of LC/Q-TOF TIC comparison traces between 8 and 9 minutes (THC elutes at 8.32 minutes). The TICs represent various cleanup methods that were investigated in this application. Each TIC trace is defined by its color: acetonitrile blank (brown); no cleanup (red), QuEChERS cleanup without dSPE (green); QuEChERS with dSPE (blue trace); winterization (purple trace); and Captiva EMR-Lipid extract (black). It is noted that the Captiva EMR-Lipid extract showed a significantly lower baseline compared to other cleanup techniques.



**Figure 4.** Comparison of the THC peak area (UV signal) from multiple cleanup treatments of an acetonitrile extract of infused milk chocolate (three samples were prepared per treatment, error bars show standard deviation).

## Conclusion

Potency testing in chocolate and baked products, such as brownies and cookies, is challenging because of high matrix complexity and lipid content. Removing lipids before analysis using LC/UV and LC/MS/MS is critical to achieve robust and accurate quantification of cannabinoids, given their affinity for fat. The procedure developed here enabled the highest lipid removal compared to other common preparation techniques for high-lipid content, resulting in a higher LC/UV signal for THC and CBD. Optimized method parameters (found in publication 5994-2873EN)<sup>1</sup> provide increased system uptime, lab productivity, and profitability. Implementation of potency testing in fatty edibles using this approach is therefore simple, accurate, and reliable, in addition to providing increased lab productivity.

## Disclaimer

Agilent products and solutions are intended to be used for cannabis quality control and safety testing in laboratories, where such use is permitted under state and country law.

## Reference

1. Deckers, C.; Roy, J.-F. Simple and Accurate Quantification of THC and CBD in Cannabis-Infused Chocolate Edibles using Agilent Captiva EMR—Lipid Removal and the Agilent 1260 Infinity II LC System, *Agilent Technologies application note*, publication number 5994-2873EN, **2020**.

[www.agilent.com/chem](http://www.agilent.com/chem)

DE44216.8655555556

This information is subject to change without notice.

© Agilent Technologies, Inc. 2021  
Printed in the USA, January 25, 2021  
5994-2998EN