

Automated Sample Preparation for *MOSH/MOAH Analysis* in Accordance to DGF C-VI 22 (20)

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Introduction and Background

For more than 10 years, the topic of potential migration of hydrocarbons, that originate from mineral oil into food, from packaging material of any kind, is widely discussed and still gets a lot of attention. The main groups, mineral oil consists of, are the groups of MOSH (Mineral Oil Saturated Hydrocarbons) and MOAH (Mineral Oil Aromatic Hydrocarbons). MOSH fractions are known to accumulate in human tissue, while MOAH even have a possible carcinogenic potential. MOSH/MOAH can be found in food (e.g. fats, chocolate, bakery products), cosmetics, and many more examples. Food samples (fats/oils) can be

processed according to DIN EN 16995:2017, that allows a LOQ > 10 mg/kg for MOSH/MOAH, while the health effects and accumulation in human tissue are also happening below this concentration. In the meantime a new method for fatty matrices (DGF C-VI 22 (20)) was published, that allows a LOQ of 1 mg/kg, involving an additional clean-up step with silica material. This poster will present first results of an automated clean-up method for MOSH/MOAH including evaporation, according to DGF C-VI 22 (20) with very good recoveries and comparability to manual processing in fatty matrices.

Material and Methods

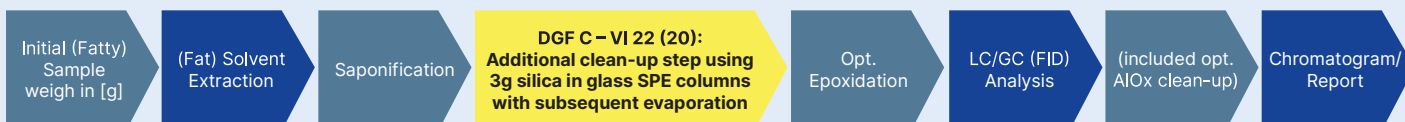


Figure 1: Complete workflow for MOSH/MOAH analysis in acc. to DGF C – VI 22 (20)

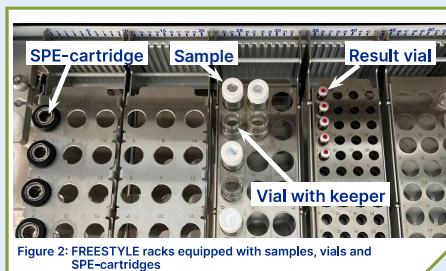


Figure 2: FREESTYLE racks equipped with samples, vials and SPE-cartridges

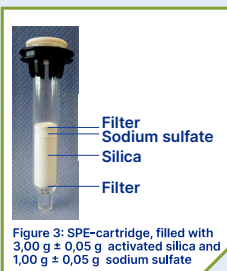


Figure 3: SPE-cartridge, filled with 3,00 g ± 0,05 g activated silica and 1,00 g ± 0,05 g sodium sulfate

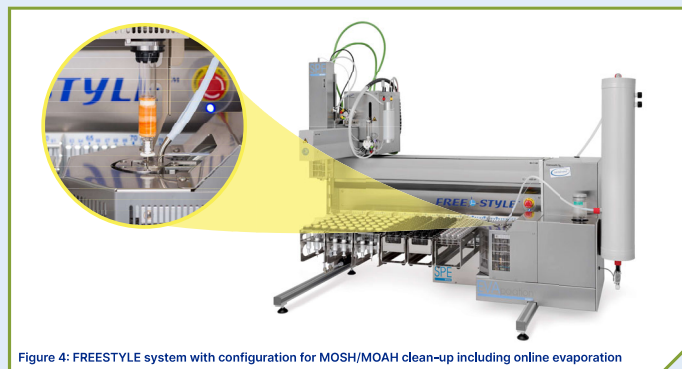


Figure 4: FREESTYLE system with configuration for MOSH/MOAH clean-up including online evaporation

Results

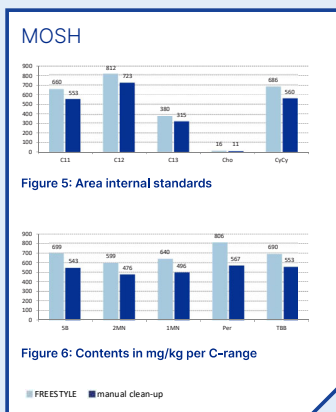


Figure 5: Area internal standards

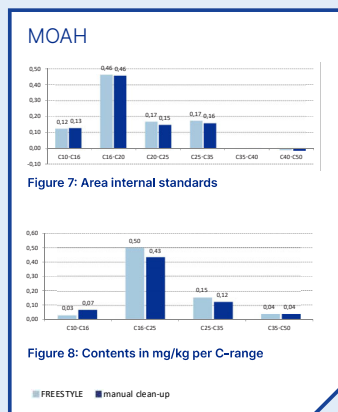


Figure 7: Area internal standards

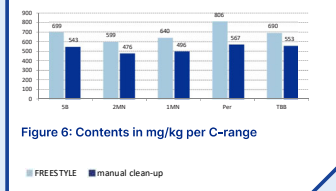


Figure 6: Contents in mg/kg per C-range

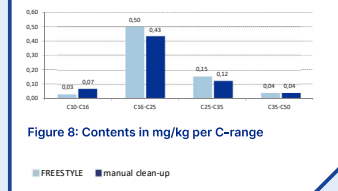


Figure 8: Contents in mg/kg per C-range

Chromatograms

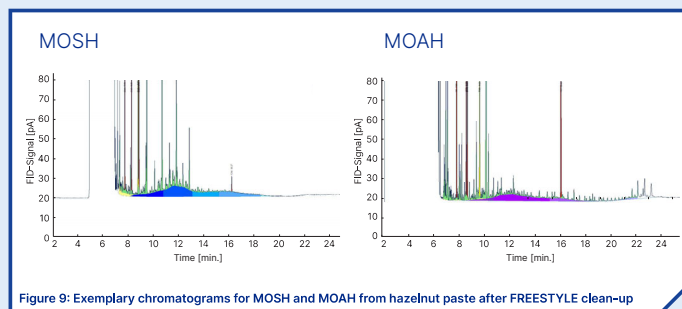


Figure 9: Exemplary chromatograms for MOSH and MOAH from hazelnut paste after FREESTYLE clean-up

Conclusion

The presented results show, that the clean-up step for MOSH/MOAH analysis according to DGF C-VI 22 (20) can easily be adapted for automation on the FREESTYLE SPE-EVA.

The results in Figure 5 and Figure 7 show, that the areas of the internal standards for MOSH and MOAH, processed with the FREESTYLE SPE-EVA are higher than the areas of the internal standards, that were processed manually. This shows the reliability and robustness of the system, as even better recoveries were achieved through automation. The results in Figure 6 and Figure 8 show, that the results of real samples processed on the FREESTYLE SPE-EVA show a very good comparability to the manual clean-up for MOSH and MOAH in fatty matrices with contents far below 1 mg/kg, which is more than 10x lower, than the LOQ described in DIN EN 16995:2017.

The applied method takes r.a. 45 minutes per sample and can be processed by the system unattended overnight or over weekends and therefore allows a common sample load of 32 samples within 24 hours. As an automated system rinsing is implemented between samples, the system has been proven for no cross contamination.

Acknowledgement

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