Is Solid Phase Microextraction (SPME) an appropriate method for extraction of volatile oxidation products from complex food systems.

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Is solid phase microextraction (SPME) an appropriate method for extraction of volatile oxidation products from complex food systems?

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Volatile secondary lipid oxidation products can be identified and quantified by GC-FID or GC-MS. An extraction step is, however, needed before GC analysis. A range of different extraction methods are available such as static headspace, dynamic headspace and SPME. Each of these methods has its advantages and drawbacks. Among the advantages of the SPME method are its high sensitivity compared to static headspace and that it is less laborious than the dynamic headspace method. For these reasons, the use of SPME has increased in both academia and industry during the last decade.

The extraction efficiency obtained with the SPME method can be affected by different factors such as fiber type, stirring of sample versus not stirring, extraction temperature and time. These factors can easily be controlled and optimized to obtain the highest possible extraction efficiency. However, extraction efficiency can also be affected by uncontrollable factors such as batch to batch variation between fibers of the same type and presence of compounds in the sample matrix, which competes with the compounds of interest for adsorption to the SPME fiber. The latter factor is particularly a problem when SPME is used for analysis of lipid oxidation during storage of complex food matrices. Examples on how uncontrollable factors have affected results obtained with the SPME method in the authors' lab will be given and the appropriateness of the SPME method for the analysis of volatile oxidation products in selected food systems will be discussed.