

Automated fatty acid profiling of raw algae's by THM-GC-MS

Key Words:

DMI
OPTIC
THM GC MS
Red Algae
Green Algae

Erwin Kaal

For identification, differentiation or characterization of algae's, the fatty acid methyl esters (FAMES) can be used. Analysis of microbial fatty acids is traditionally carried out by manual sample preparation, for example the BF₃/MeOH method. Although this traditional method performs well, the disadvantages are the rather long preparation steps and the large sample amount required.

For rapid profiling of algae's with reduced sample preparation, the newly developed thermally assisted hydrolysis and methylation (THM)-GC-MS can be used. THM is becoming the tool of choice for the determination of FAMES and can be performed easily inside the OPTIC PTV-injector. The dried or raw algae's can be directly introduced and automated derivatized into FAMES. The automated OPTIC THM-GC-MS method is fast and very reliable. The THM is performing well because the reaction occurs in perfect inert conditions, the OPTIC can be heated rapidly, and temperature and the gas flow can be controlled. Other major advantage of performing THM inside the OPTIC injector is that no transfer line is needed which avoids carry-over and it is possible to perform split less transfers.

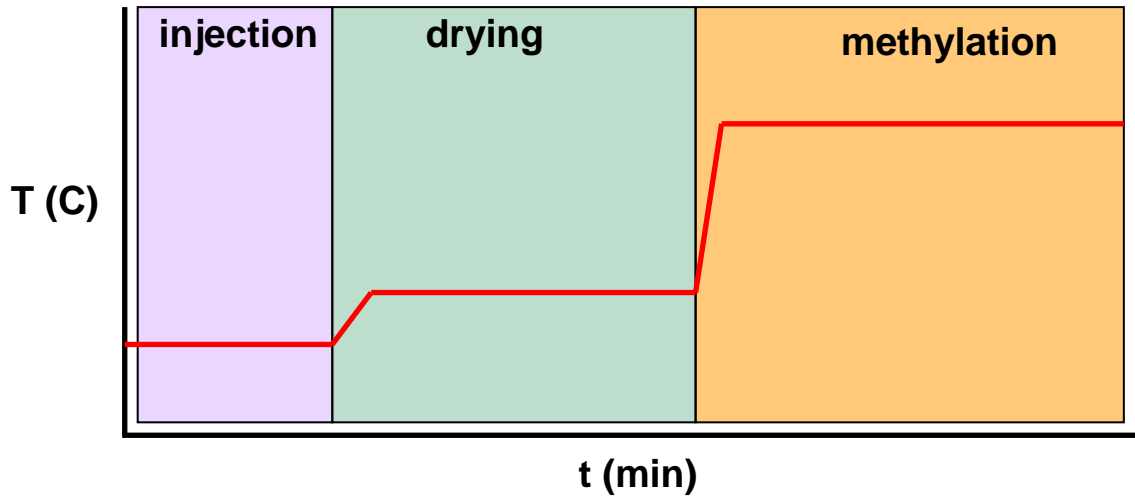
In this application note, two algae samples, a red and a green one, were analyzed.

Sample materials

Dried algae material
Reagens

Experimental

Injector: OPTIC 3
Liner: Fritted liner + micro-cup
Auto sampler: CombiPAL
GC-MS: Shimadzu 2010



Results

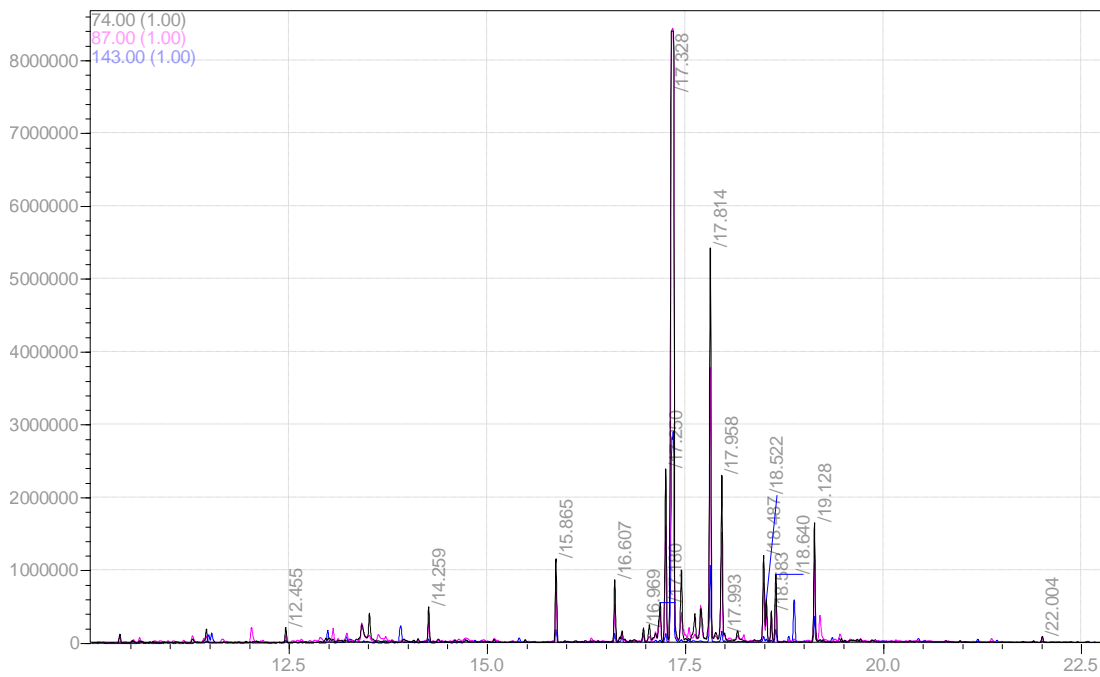


Figure 1: SIM-chromatogram of the red algae-sample using the novel OPTIC THM-GC-MS method. To show all saturated FAMES, m/z 74,87 and 143 are selected.

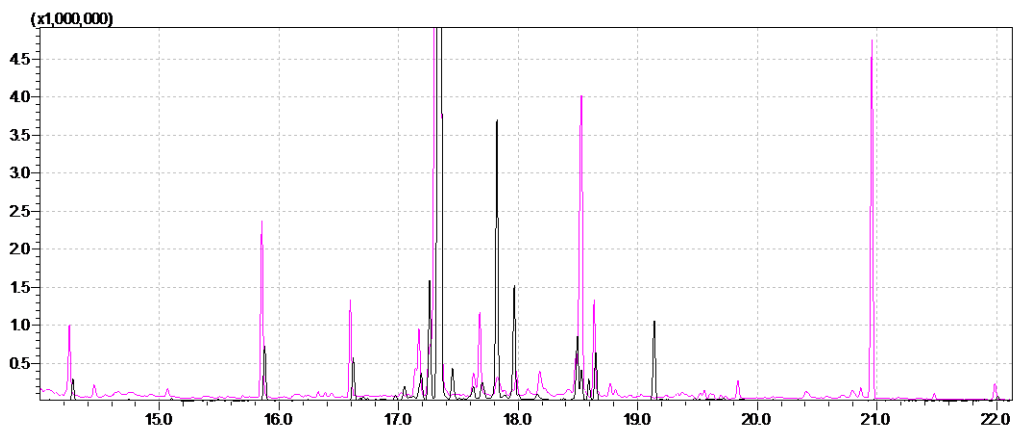


Figure 2: A part of a TIC-chromatograms obtained from the red and the green algae's. Clearly, many differences as well as similarities can be seen from the figure between the two algae.

Conclusion:

Automated FAME profiling of algae's can be done using the OPTIC THM-GC-MS method. Quantitative results can be obtained using this novel method. Degradation of unsaturated FAME was absent because of using a low THM-temperature and the correct reagent.