Food packaging additives library and its features

[Background] The Ministry of Health, Labor and Welfare of Japan has been implementing a positive list system for compounds that can be used in food contact utensils, containers, and packaging since June 1, 2020. We have created a new additive library for food contact materials by compiling 90 new additives listed in the positive list but not included in the existing F-Search additive library, and currently we are offering it free of charge. This report introduces an example of additives registered in the library and describes its stored information and utilization methods.

[Experimental] For measurements, a GC/MS system with a Multi-Shot Pyrolyzer directly interfaced to the GC injection port was used. Thermal desorption at 400 ºC and pyrolysis at 600 ºC were carried out on the standard samples of the additives. The evolved gases were separated using a GC column and then detected by MS.

[Description] In the analysis of additives in polymers, thermal desorption GC/MS is commonly used when the additive content is relatively low. Therefore, the present library contains information on additives obtained from thermal desorption at 400 ºC, as shown in Figs. 1(a) and 2(a). On the other hand, when the additive content is high or when interference from peaks originating from pyrolyzates of the base polymer is negligible, pyrolysis GC/MS measurements are often carried out. Accordingly, the library also contains information on the pyrolyzates of additives obtained from pyrolysis at 600 ºC, as shown in Figs. 1(b) and 2(b). In the total ion current chromatogram (TICC), not only the additives themselves but also their pyrolyzates and impurities are observed. Similar to other F-Search libraries, the library contains the mass spectra of major peaks on the TICC, retention indices, and the TICC itself. These features allow identification of peaks in TICCs of additives by comparing not only the mass spectral match rate, but also the TICC profile and detailed compound information, including unknown compounds. By comprehensively compiling various types of information, the library retains the distinct features of an F-Search library.

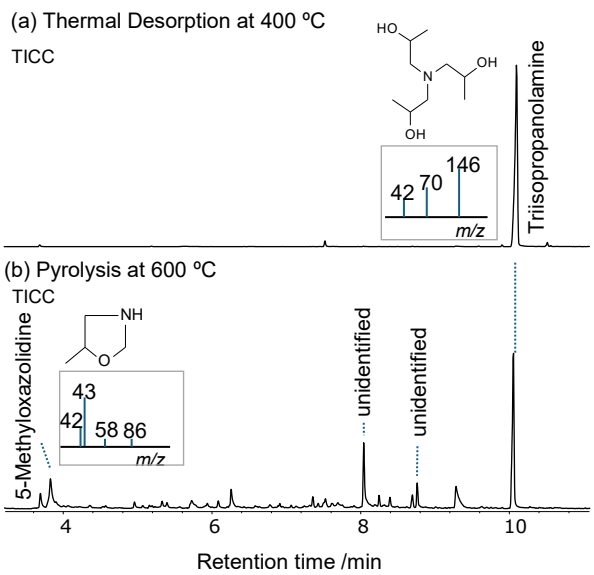

Fig. 1 Details of triisopropanolamine stored in the library

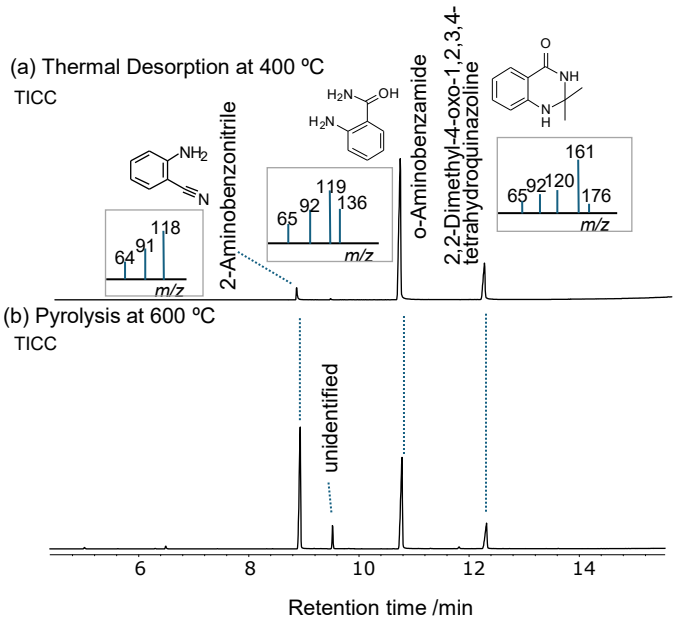

Fig. 2 Details of *o*-aminobenzamide stored in the library

Furnace temp.: 400 or 600 ºC, Separation column: UA⁺-5 (5 % diphenyl-95 % dimethylpolysiloxane, *L*=30 m, i.d.=0.25 mm, df=0.25 µm), GC oven temp.: 40 ºC(2 min) - 320 ºC (20 ºC/min, 4 min hold), Column flow rate: 1.0 mL/min (He), Split ratio: 1/50, Detector: quadrupole MS, Sample amount.: 50 µg

1) The standard additives were kindly provided by the National Institute of Health Sciences (NIHS), Japan.

Keywords : F-Search, Additive library, Thermal desorption-GC/MS, Pyrolysis-GC/MS

Products used : F-Search

Applications : Additive analysis

Related technical notes :

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