_JEOL MS Data Sheet_

# *MS Tips*

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*No.151*

*JMS-T100GCV Application Data*

# Analysis of polymer additives using DIP-EI and FD

## [Introduction]

This report shows the result of the ionization of phenolic polymer antioxidants analyzed by electron ionization (EI) with direct insertion probe（DIP）and field desorption (FD)．
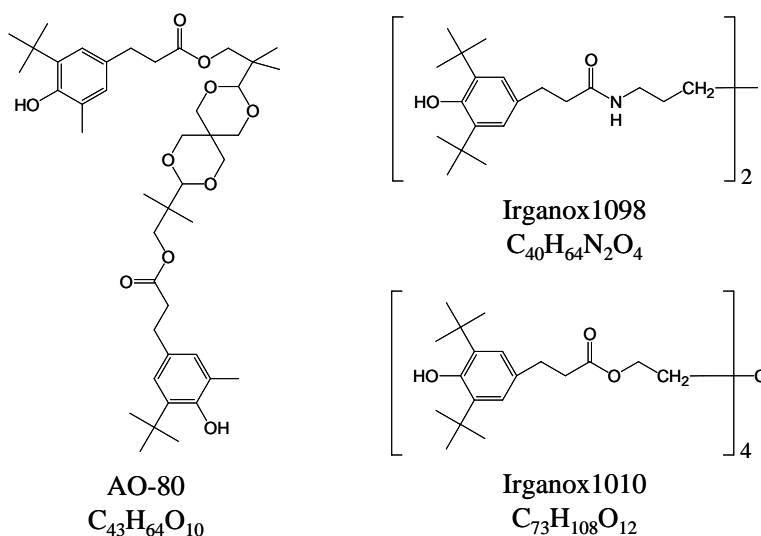
## [Method]

### Samples

Phenolic antioxidant

  AO-80 (1mg/mL in methanol)

  Irganox1098 (1mg/mL in methanol)

  Irganox1010 (1mg/mL in methanol)

Irganox1098
$C_{40}H_{64}N_2O_4$

AO-80
$C_{43}H_{64}O_{10}$

Irganox1010
$C_{73}H_{108}O_{12}$

### Measurement conditions

See table 1.

Fig.1 Structural formula of sample compounds

Table 1  Measurement conditions.

| Instrument | JMS-T100GCV (JEOL Ltd.) |
|---|---|
| Direct probe | DIP |
| Ionization mode | EI+ (70eV, 300µA) |
| Probe condition | 50℃ → 64℃/min → 400℃ |
| Ion source temp. | 280℃ |
| $m/z$ range | $m/z$ 50-1500 |
| Spectrum recording time | 1.0sec |
| Direct probe | FDP |
| Ionization mode | FD+ (Cathode volt.: -10kV) |
| Probe condition | 0mA → 51.2mA/min → 40mA |
| Ion source temp. | Heater OFF |
| $m/z$ range | $m/z$ 50-1500 |
| Spectrum recording time | 0.5sec |

Glass tube

(a) DIP（Direct Insertion Probe）

Carbon emitter
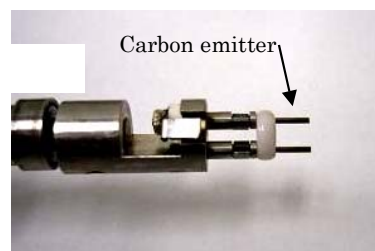
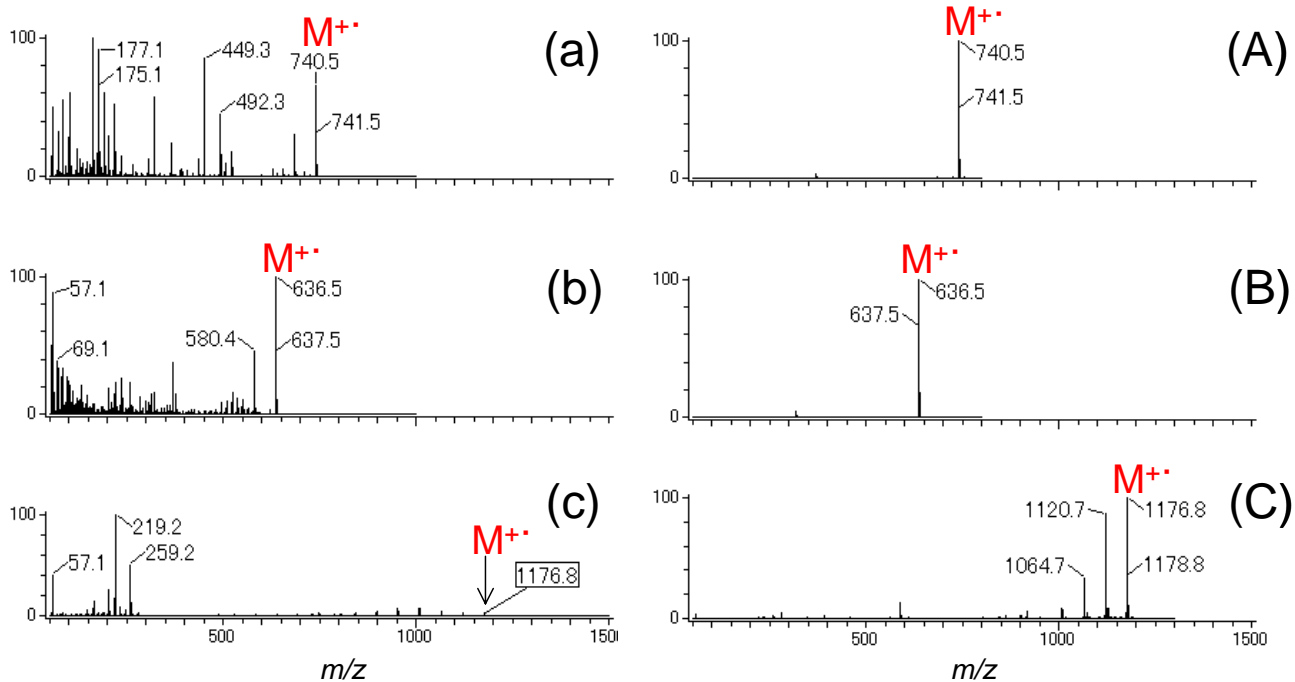(b) FDP（Field Desorption Probe）

Fig.2  Picture of direct probes.

Fig.3 : Mass spectra of phenolic antioxidant by DIP-EI and FD.

EI mass spectra: (a) AO-80, (b) Irganox1098, (c) Irganox1010

FD mass spectra: (A) AO-80, (B) Irganox1098, (C) Irganox1010

## [Result and discussion]

The analysis time was about 5 minutes by DIP-EI and about 1 minute by FD when measurement condition in Table 1 was used.

The observed mass spectra are shown in Fig. 3. The molecular ion was observed in all mass spectra. However, the ion intensity of the molecular ion of Irganox1010 by using DIP-EI was remarkably lower than the ion intensity of other fragment ions. On the other hand, the molecular ion was observed as base peak in all mass spectra by using FD.

The JMS-T100GCV is capable to analyze antioxidants simply and quickly by using a direct injection method. This report shows that the JMS-T100GCV can be used for classic GC/MS but also for DI/MS as very useful tool for qualitative analysis.