

# Characterization of Chinese crude propolis using evolved gas analysis (EGA)-MS

**[Background]** Propolis contains a variety of bioactive compounds including flavonoids, phenolic acids, and terpenoids. It is widely used in foods, cosmetics, and medicine. The composition and relative concentrations of these constituents varies depending on geographical regions, floristics and seasons. Flavonoids, the most important constituents in propolis, are known to exist as both aglycones and glycosides. In this note, EGA-MS analysis of flavonoids in a propolis sample (collected in Shandong Province, China) is described.

**[Experimental]** The analytical system consists of a Multi-Shot Pyrolyzer (EGA/PY-3030D) coupled with a GC/MS system. A short, deactivated EGA tube (UADTM-2.5M) connects the GC injection port and the MS detector. The furnace temperature was programmed from 70 to 700 °C (20 °C/min). The GC oven temperature was fixed at 300 °C. The column flow rate was 1.0 mL/min (He). The scan range was  $m/z$  50 - 600 with scan rate of 0.2 scan/s. Sample weight was 0.5 mg for propolis and 0.05 mg for the reference samples.

**[Results]** The thermal behaviors of the flavonoid components, such as aglycones was investigated by EGA-MS. Fig. 1 shows (1) the total ion thermogram (TIT) of this propolis sample, (2) extracted ion thermograms (EITs) of the molecular ions of flavonoids ( $m/z$  254, 256, 268, 270 and 272), and (3) EITs of molecular ions used to identify chrysin, pinocembrin, tectochrysin, galangin and naringenin. It is noted that both EITs of  $m/z$  254 and 268 show a single peak. These peaks are in agreement with the molecular ions of chrysin and tectochrysin. This indicates that chrysin and tectochrysin exist only as aglycones. It is important to note that all EITs of  $m/z$  256, 270 and 272 exhibited two peaks. The second peaks of these EITs are considered to be the decomposition products of glycosides of pinocembrin, galangin and naringenin, respectively. The above results indicate that chrysin and tectochrysin in propolis exist only as aglycones, while pinocembrin, galangin, and naringenin exist as both aglycones and glycosides.

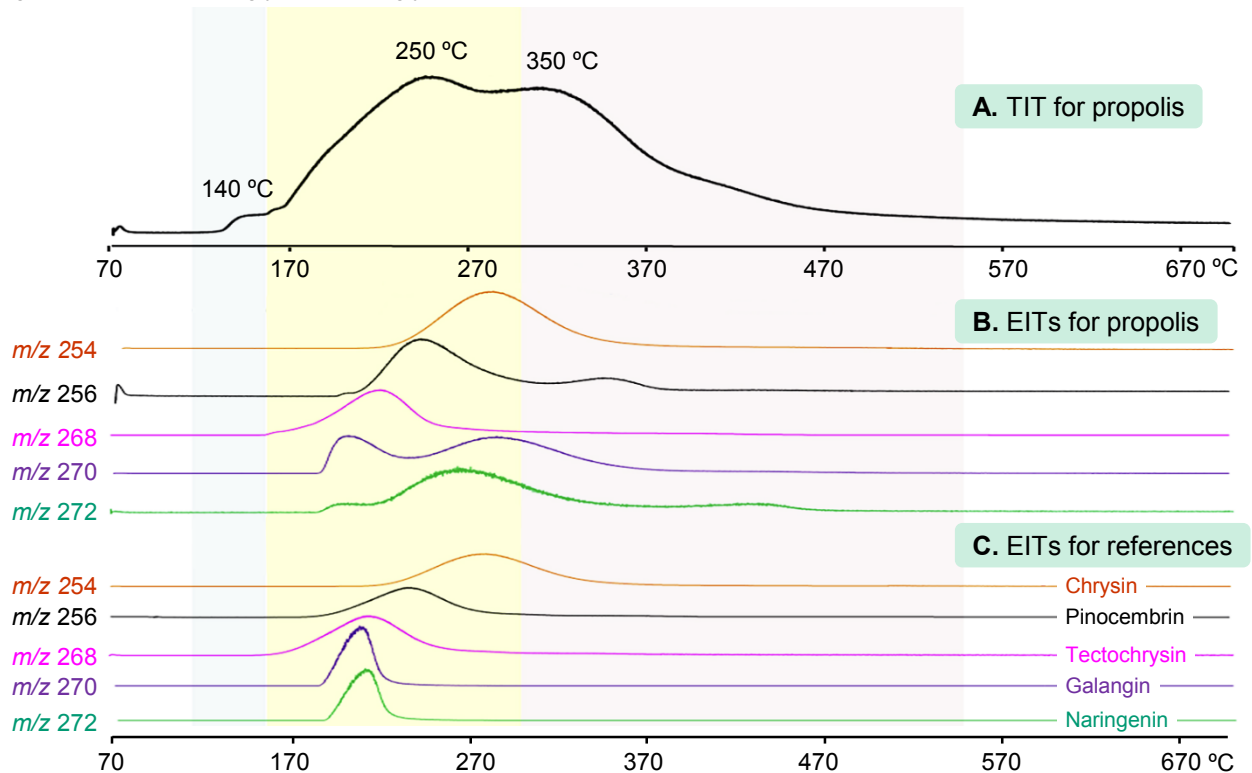


Fig. 1 **A.** Total ion thermogram (TIT) of a propolis sample, **B.** Extracted ion thermograms (EITs) of molecular ions of flavonoids for propolis, and **C.** EITs of molecular ions of chrysin, pinocembrin, tectochrysin, galangin, and naringenin.

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**Products used :** Multi-functional pyrolyzer, UADTM-2.5N,

**Applications :** General drug analysis

**Related technical notes :** [PYA1-030E](#), [PYA1-031E](#), [PYA1-032E](#)

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