

What is being measured: Global profiling of non-polar terpene (hydrocarbon) and terpenoid (oxygenated) compound classes. Terpenes/terpenoids make up a large group of structurally diverse compounds that serve a variety of physiological functions in plants and animals including cellular structure and signaling, plant defense from biotic and abiotic stressors, pollinator attraction, etc.

How it is done: Terpenes and terpenoids are extracted from samples in hexane and analyzed on gas chromatograph coupled to a high resolution accurate mass spectrometer (GC-QToF). Compound identification is achieved through the matching accurate mass and EI fragmentation pattern with in-house mass spectral libraries (Wiley, NIST, Kovats). Absolute quantitation is possible when the authentic standards are available.

Relative quantitation is determined by normalization with isotope labeled internal standard.

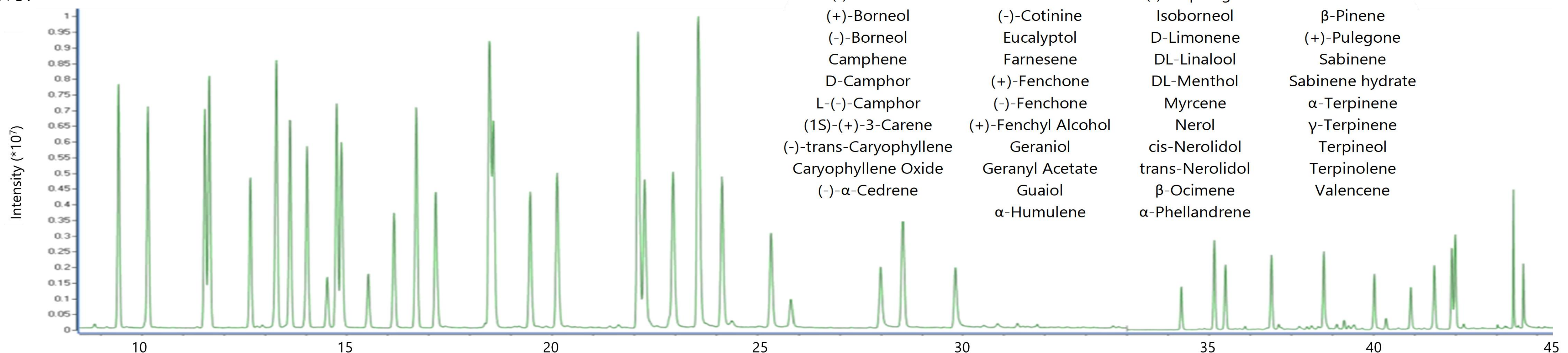
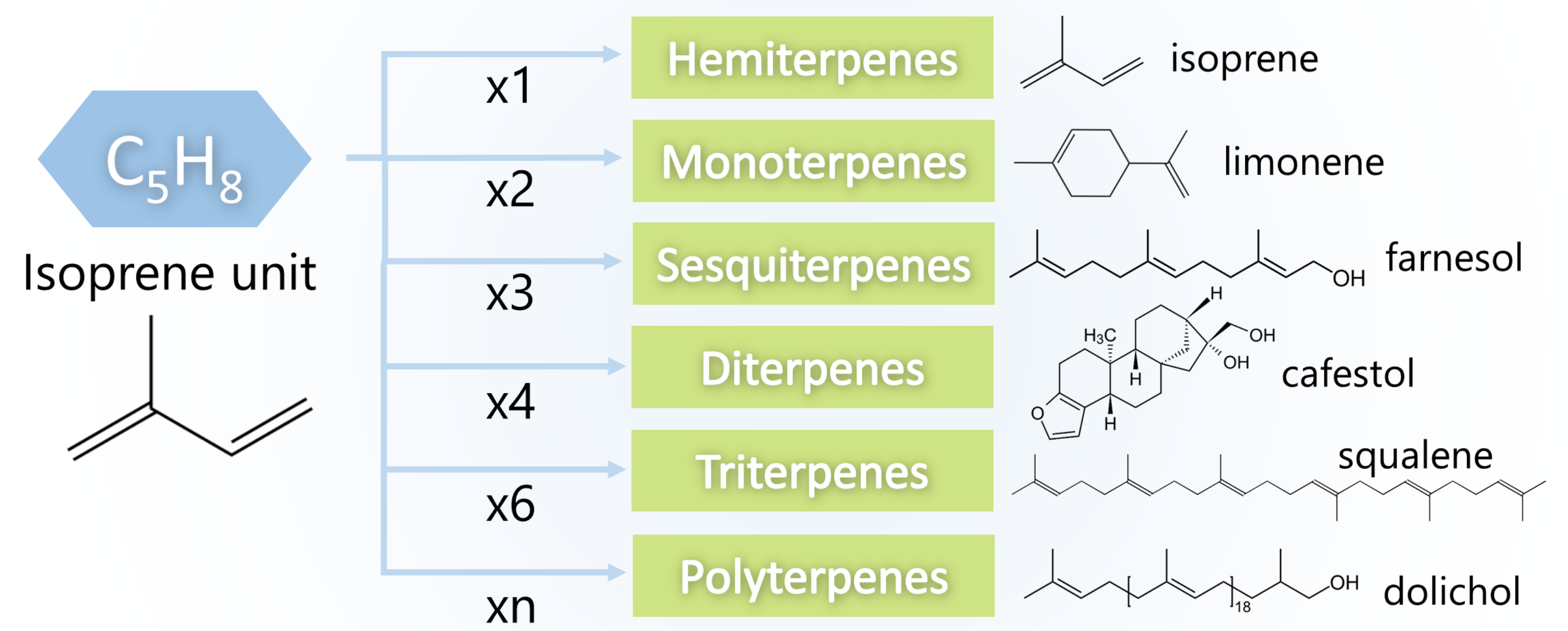


Figure 1. Chromatographic separation of over 40 terpenes and terpenoids using GC-QToF (MUAL data).

RESULTS

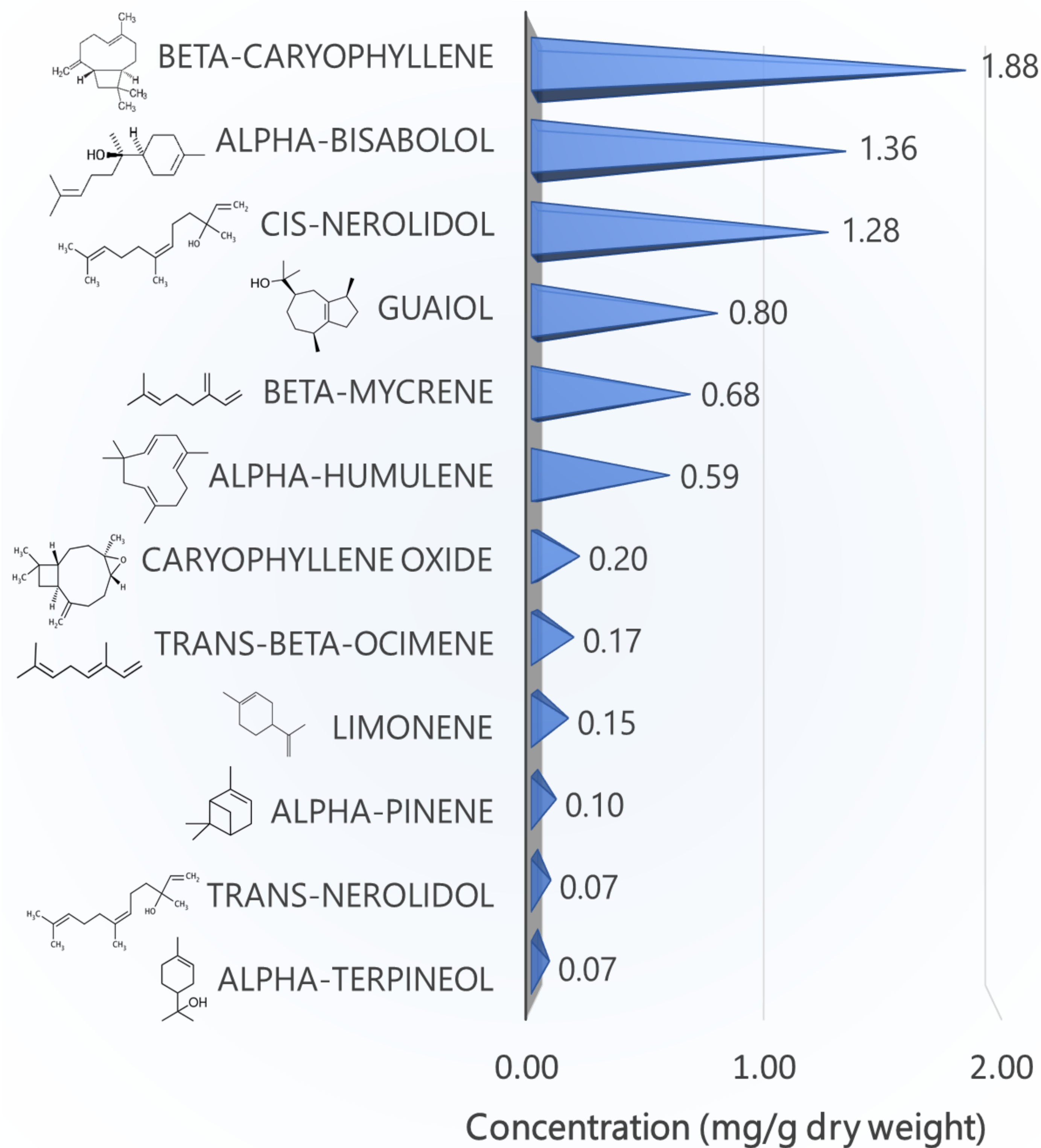


Figure 2. Major terpenes and terpenoids detected above 0.05 mg/g dry weight in industrial hemp; average concentration from five hemp varieties (MUAL data).

Major Terpenoids of Hemp Varieties

Concentration in mg/g dry weight

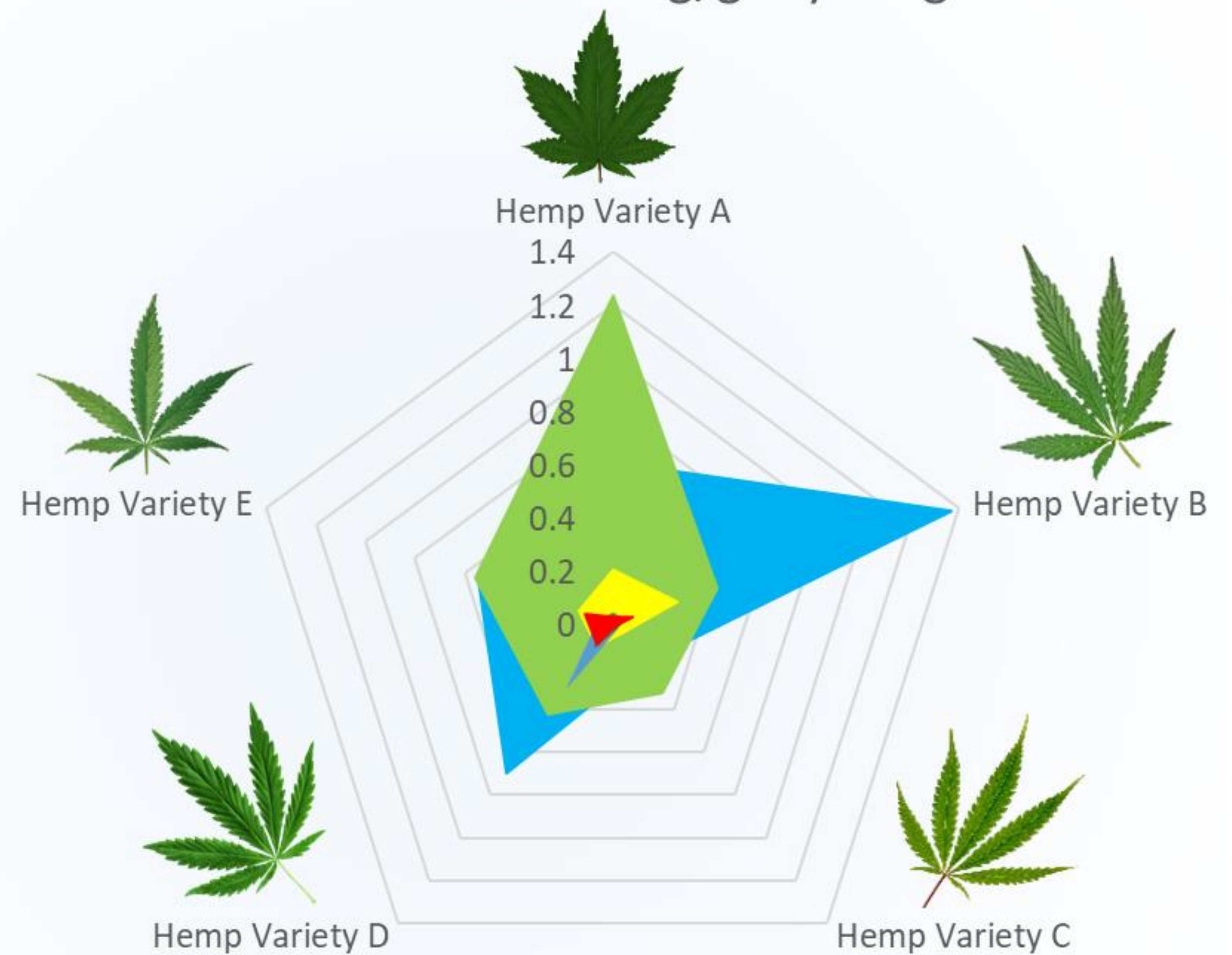


Figure 3. Relative quantities (mg/g dry weight) of major terpenes and terpenoids in five industrial hemp cultivars highlighting the diversity among plant terpenes (MUAL data).

INSTRUMENTATION

Agilent GC/Q-TOF (7890B/7250)

Primary Applications

- Global Metabolomics
- Characterization & Quantitation of GC-amenable compounds



Features

- Quadrupole Time-of-flight mass spectrometer
- Delivers full-spectrum, high-resolution, accurate-mass data
- Low-energy EI for softer ionization and molecular ion enhancement
- Elucidates chemical structures with MS/MS capabilities
- TOF mass accuracy- < 2ppm RMS
- TOF Resolution > 25,000 at m/z 271.896
- Data acquisition rates of up to 50 spectra per second
- Electron Ionization, settable 5-200 eV

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