Supplementary Materials of:

Monoterpene chemical speciation with high time resolution using a FastGC/PTR-MS: Results from the COV^{3}ER experiment on *Quercus ilex*

Optimization phase

1- Dilution system for monoterpene sampling

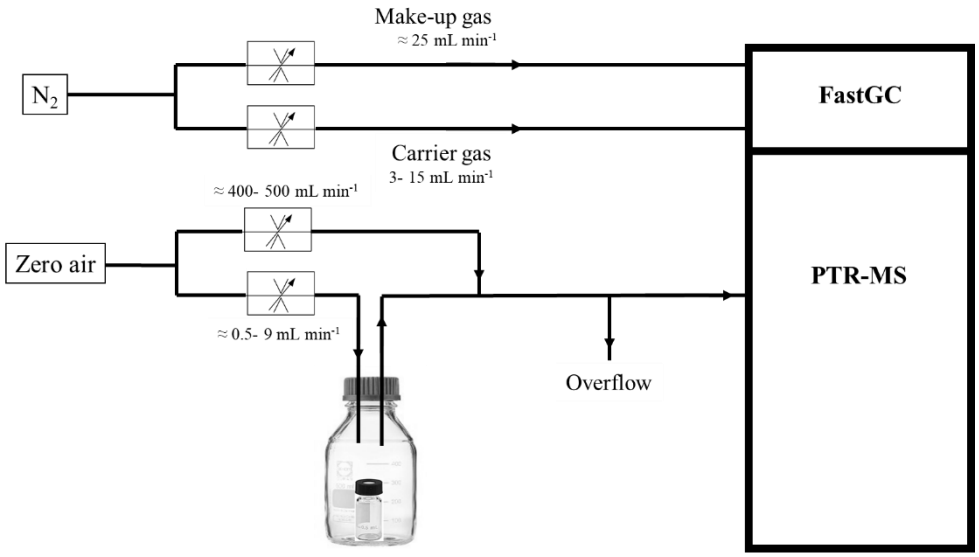

Figure S1. Schematic of the sampling system built for laboratory FastGC/PTR-MS experiments on MT standards.

2- Tested voltage ramps (Temperature programs)

Table S1. Summary of the tested Voltage ramps (temperature programs).

Ramp I	**Time (s)**	**0**	**20**	**40**	**60**	**90**	**120**	**140**	**150**	**160**
	Voltage (V)	**11**	**20**	**30**	**45**	**60**	**70**	**80**	**80**	**0**
Ramp 1	**Time (s)**	**0**	**60**	**90**	**120**	**121**				
	Voltage (V)	**25**	**35**	**45**	**45**	**25**				
Ramp 2	**Time (s)**	**0**	**30**	**120**	**150**	**151**				
	Voltage (V)	**30**	**35**	**45**	**45**	**25**				
Ramp 2.1	**Time (s)**	**0**	**30**	**120**	**180**	**181**				
	Voltage (V)	**30**	**35**	**45**	**45**	**30**				
Ramp 2.2	**Time (s)**	**0**	**30**	**120**	**150**	**181**				
	Voltage (V)	**30**	**35**	**45**	**50**	**30**				
Ramp 2.3	**Time (s)**	**0**	**30**	**120**	**150**	**181**				
	Voltage (V)	**35**	**35**	**45**	**50**	**30**				
Ramp 2.4	**Time (s)**	**0**	**30**	**120**	**150**	**181**				
	Voltage (V)	**5**	**35**	**45**	**50**	**30**				
Ramp 2.5	**Time (s)**	**0**	**30**	**120**	**150**	**181**				
	Voltage (V)	**5**	**35**	**45**	**50**	**50**				
Ramp 2.6	**Time (s)**	**0**	**10**	**100**	**130**	**160**				
	Voltage (V)	**5**	**35**	**45**	**50**	**50**				
Ramp 3	**Time (s)**	**0**	**30**	**120**	**150**	**151**				
	Voltage (V)	**35**	**40**	**55**	**55**	**25**				
Ramp 4	**Time (s)**	**0**	**45**	**120**	**140**	**150**				
	Voltage (V)	**35**	**35**	**70**	**70**	**35**				
Ramp 5	**Time (s)**	**0**	**30**	**120**	**150**	**151**				
	Voltage (V)	**35**	**40**	**50**	**50**	**35**				
Ramp 6	**Time (s)**	**0**	**30**	**120**	**150**	**151**				
	Voltage (V)	**35**	**40**	**60**	**60**	**35**				
Ramp 7	**Time (s)**	**0**	**30**	**120**	**150**	**151**				
	Voltage (V)	**35**	**45**	**55**	**55**	**35**				
Ramp 8	**Time (s)**	**0**	**180**							
	Voltage (V)	**30**	**50**							
Ramp 9	**Time (s)**	**0**	**180**							
	Voltage (V)	**35**	**55**							
Ramp 9'	**Time (s)**	**0**	**120**							
	Voltage (V)	**35**	**55**							
Ramp 10	**Time (s)**	**0**	**180**							
	Voltage (V)	**40**	**60**							
Ramp 11	**Time (s)**	**0**	**10**	**100**	**140**	**160**	**161**			
	Voltage (V)	**5**	**35**	**45**	**50**	**50**	**0**			

3- Tested combinations of voltage ramps and carrier gas flow rates

Table S2. Summary of the different combinations of voltage ramps and carrier gas flow rates tested during laboratory tests.

Test Num	Carrier gas	Make-up gas	Voltage conditions	Sample
1	N2, 10 sccm	N2, 25 sccm	35 V	Headspace samples
2	N2, 3 sccm	N2, 25 sccm	45 V	MTs home-made gas mixture
3	N2, 5 sccm	N2, 25 sccm	45 V	MTs home-made gas mixture
4	N2, 10 sccm	N2, 25 sccm	45 V	Headspace samples
5	N2, 10 sccm	N2, 25 sccm	50 V	Headspace samples
6	N2, 10 sccm	N2, 25 sccm	60 V	Headspace samples
7	N2, 5 sccm	N2, 25 sccm	Ramp I	MTs home-made gas mixture
8	N2, 5 sccm than 15 sccm	N2, 25 sccm	Ramp I	MTs home-made gas mixture
9	N2, 10 sccm	N2, 25 sccm	Ramp I	Headspace samples
10	N2, 15 sccm	N2, 25 sccm	Ramp I	MTs home-made gas mixture
11	N2, 10 sccm	N2, 25 sccm	Ramp 1	MTs home-made gas mixture
12	N2, 3 sccm	N2, 25 sccm	Ramp 2	MTs home-made gas mixture
13	N2, 5 sccm	N2, 25 sccm	Ramp 2	MTs home-made gas mixture
14	N2, 8 sccm	N2, 25 sccm	Ramp 2	MTs home-made gas mixture
15	N2, 10 sccm	N2, 25 sccm	Ramp 2	MTs home-made gas mixture
16	N2, 15 sccm	N2, 25 sccm	Ramp 2	MTs home-made gas mixture
17	N2, 5 sccm	N2, 25 sccm	Ramp 3	MTs home-made gas mixture
18	N2, 5 sccm	N2, 25 sccm	Ramp 4	MTs home-made gas mixture
19	N2, 5 sccm	N2, 25 sccm	Ramp 5	MTs home-made gas mixture
20	N2, 8 sccm	N2, 25 sccm	Ramp 5	MTs home-made gas mixture
21	N2, 2 sccm	N2, 25 sccm	Ramp 6	MTs home-made gas mixture
22	N2, 3 sccm	N2, 25 sccm	Ramp 6	MTs home-made gas mixture
23	N2, 5 sccm	N2, 25 sccm	Ramp 6	MTs home-made gas mixture
24	N2, 8 sccm	N2, 25 sccm	Ramp 6	MTs home-made gas mixture
25	N2, 3 sccm	N2, 25 sccm	Ramp 7	MTs home-made gas mixture
26	N2, 5 sccm	N2, 25 sccm	Ramp 7	MTs home-made gas mixture
27	N2, 8 sccm	N2, 25 sccm	Ramp 7	MTs home-made gas mixture
28	N2, 3 sccm	N2, 25 sccm	Ramp 8	MTs home-made gas mixture
29	N2, 3 sccm	N2, 25 sccm	Ramp 9	MTs home-made gas mixture
30	N2, 15 sccm than 3 sccm	N2, 25 sccm	Ramp 9	MTs home-made gas mixture
31	N2, 3 sccm	N2, 25 sccm	Ramp 10	MTs home-made gas mixture
32	N2, 3 sccm	N2, 25 sccm	Ramp 9'	MTs home-made gas mixture
33	N2, 5 sccm	N2, 25 sccm	Ramp 9'	MTs home-made gas mixture
34	N2, 3 sccm	N2, 25 sccm	Ramp 2.1	MTs home-made gas mixture
35	N2, 3 sccm	N2, 25 sccm	Ramp 2.2	MTs home-made gas mixture
36	N2, 3 sccm	N2, 25 sccm	Ramp 2.3	MTs home-made gas mixture
37	N2, 3 sccm	N2, 25 sccm	Ramp 2.4	MTs home-made gas mixture
38	N2, 3 sccm	N2, 25 sccm	Ramp 2.5	MTs home-made gas mixture
39	N2, 3 sccm	N2, 25 sccm	Ramp 2.6	MTs home-made gas mixture
40	He, 3 sccm*	N2, 25 sccm	Ramp 2.6	α-pinene gas standard
41	He, 6 sccm*	N2, 25 sccm	Ramp 2.6	α-pinene gas standard
42	He, 2 sccm*	N2, 15 sccm	Ramp 2.6	NPL gas standard
43	He, 3 sccm*	N2, 15 sccm	Ramp 2.6	NPL gas standard
44	He, 4 sccm*	N2, 15 sccm	Ramp 2.6	NPL gas standard
45	He, 3 sccm*	N2, 15 sccm	Ramp 11	NPL gas standard

*The real flow rate of He = the displayed flow rate indicated in the table x 1.4
with 1.4 being the public standard conversion factor of He.

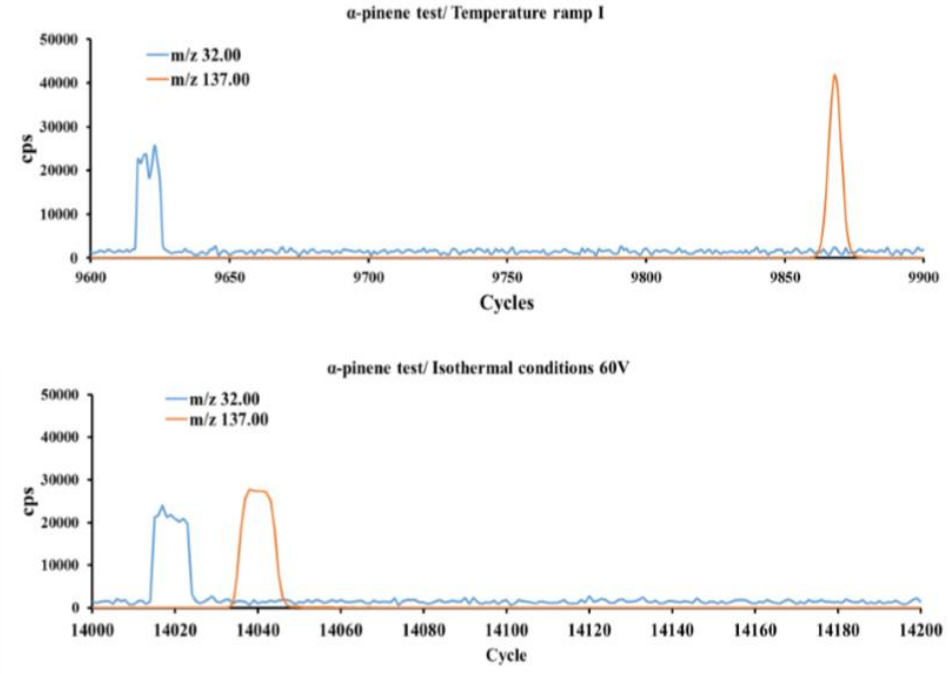

Figure S2. FastGC/ PTR-MS chromatograms after the injection of an α-pinene sample. *m/z* 32 and *m/z* 137 refer to O_2 and α-pinene, respectively.

4- PTR-MS mass transmission

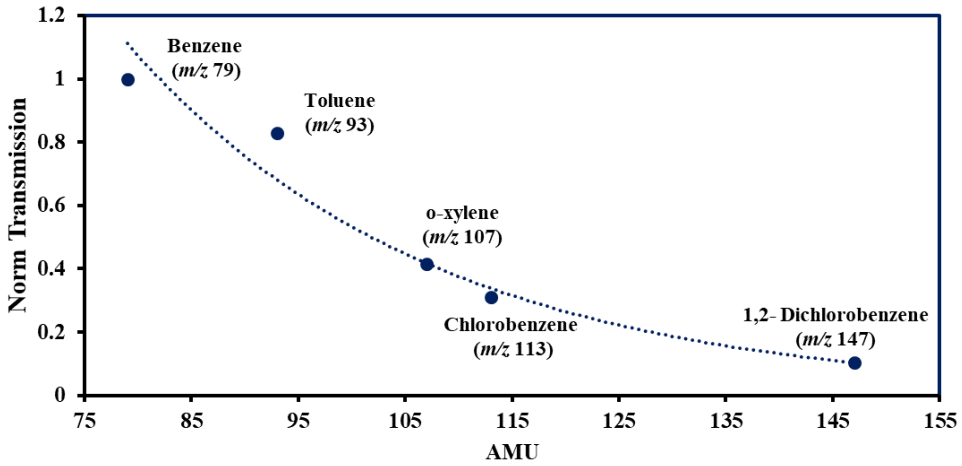

Figure S3. Mass transmission from the injection of the GCU gas standard with the fitting curve by an exponential function.

Figure S3 presents an experimental transmission curve of the QMS, which was obtained by injecting the Gas Calibration Unit (GCU, Ionicon Analytik Gmbh) gas standard. The results obtained highlight the mass discrimination effect for the mass range of 79 to 147 amu.

Field campaign: Total MTs foliar emissions

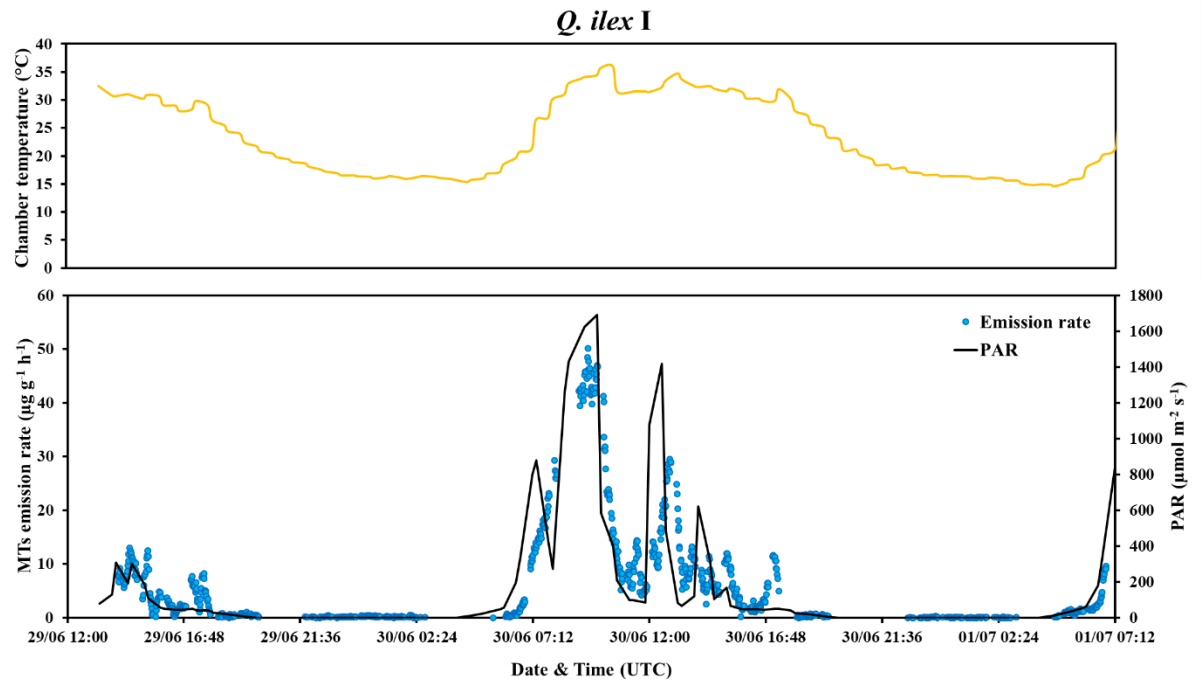

Figure S4. Total MTs emission rate for *Q.* i*lex* I branch chamber.

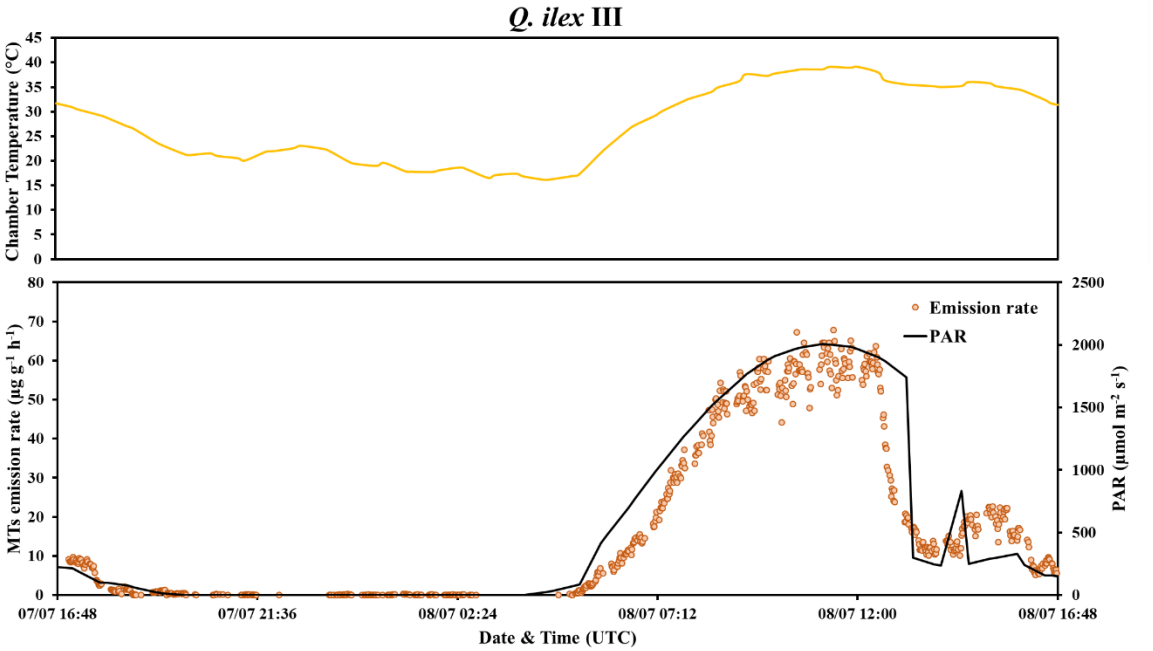

Figure S5. Total MTs emission rate for *Q. ilex* III branch chamber.

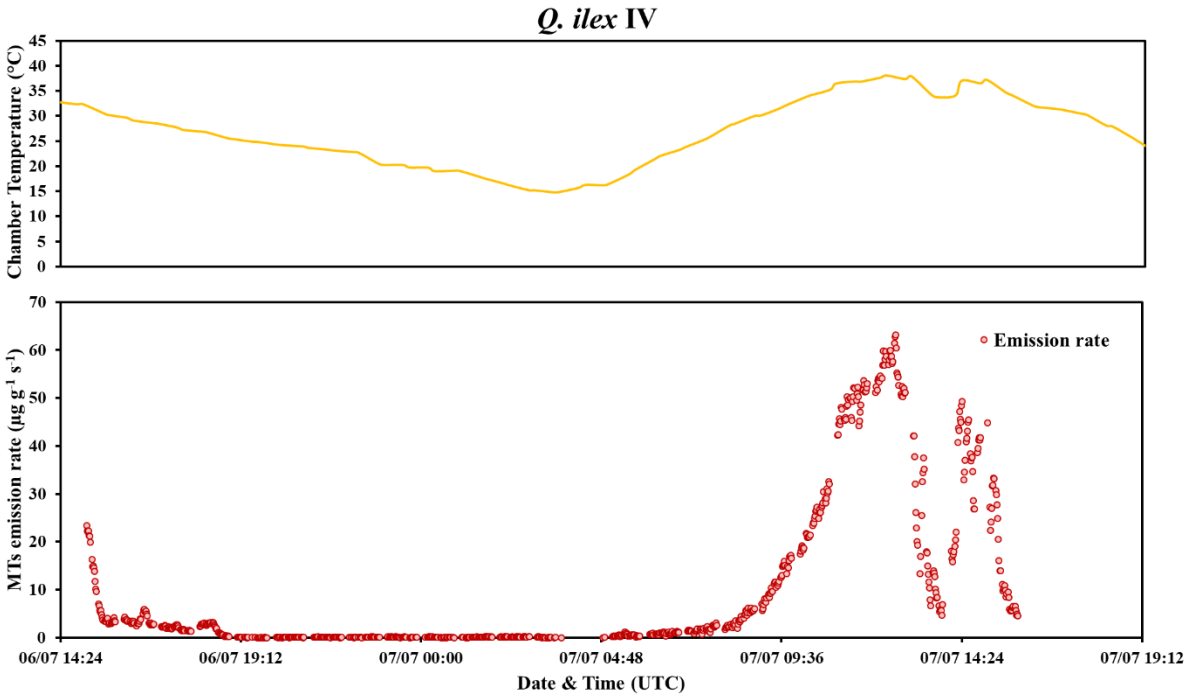

Figure S6. Total MTs emission rate for *Q. ilex* IV branch chamber.