Phenolics lie at the center of functional versatility in the responses of two phytochemically diverse tropical trees to canopy thinning

Supplementary data

Table S1. BLAST® ITS sequence matches for field-collected fungal pathogen. GenBank IDs of matches identified as belonging to the genus *Colletotrichum* are highlighted. All others are listed in GenBank as unidentified fungal endophytes.

GenBank ID	Sequence match %	Alignment length	Mismatches	Gaps	Accession sequence length	Bit score
KF436296.1	100	1041	0	0	1052	1923
KF436293.1	100	1041	0	0	1048	1923
KF436255.1	100	1041	0	0	1058	1923
KF436248.1	100	1041	0	0	1045	1923
KF436210.1	100	1041	0	0	1050	1923
KF436156.1	100	1041	0	0	1045	1923
KF435937.1	100	1041	0	0	1054	1923
KF435866.1	100	1041	0	0	1049	1923
KF435862.1	100	1041	0	0	1044	1923
KF435591.1	100	1041	0	0	1048	1923
KF435383.1	100	1041	0	0	1045	1923
EU687143.1	100	1041	0	0	1042	1923
EU687077.1	100	1041	0	0	1045	1923
EU687086.1	100	1041	0	0	1056	1923
EU686906.1	100	1041	0	0	1055	1923
EU686865.1	100	1041	0	0	1055	1923
EU686825.1	100	1041	0	0	1055	1923
EU686799.1	100	1041	0	0	1050	1923

KF436303.1	100	1040	0	0	1057	1921
KF436290.1	100	1040	0	0	1054	1921
KF435173.1	100	1040	0	0	1053	1921
KU977781.1	99.904	1042	0	1	1046	1917
KU977778.1	99.904	1042	0	1	1051	1917
KU747842.1	99.904	1042	0	1	1046	1917
KF436345.1	99.904	1042	0	1	1051	1917
KF436318.1	99.904	1042	0	1	1055	1917
KF436246.1	100	1038	0	0	1038	1917
KF436168.1	99.904	1042	0	1	1045	1917
KF436025.1	99.904	1041	1	0	1053	1917
KF435977.1	99.904	1042	0	1	1050	1917
KF435935.1	99.904	1042	0	1	1051	1917
KF435813.1	99.904	1042	0	1	1045	1917
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KF435207.1	99.904	1042	0	1	1046	1917
KF435153.1	99.904	1042	0	1	1046	1917
EU687103.1	99.904	1042	0	1	1056	1917
EU686951.1	99.904	1042	0	1	1046	1917
EU686963.1	100	1038	0	0	1038	1917
KF435607.1	99.904	1041	0	1	1055	1916
KF435579.1	99.904	1040	1	0	1044	1916
KF435328.1	99.904	1041	0	1	1045	1916

KF435190.1	99.904	1040	1	0	1044	1916
EU687101.1	99.904	1041	0	1	1054	1916
KU747940.1	100	1036	0	0	1036	1914
KU747802.1	100	1036	0	0	1036	1914
KF435335.1	100	1036	0	0	1036	1914
KF435199.1	100	1036	0	0	1036	1914
KF436355.1	99.808	1041	2	0	1050	1912
KF435434.1	99.808	1042	1	1	1054	1912
KF435297.1	99.808	1042	0	2	1048	1912
EU687083.1	99.904	1039	0	1	1039	1912
EU687080.1	99.808	1042	1	1	1056	1912
EU552111.1	99.808	1042	1	1	1190	1912
EU379556.1	99.808	1042	1	1	1047	1912
EF221830.1	99.808	1042	1	1	1057	1912
EF424484.1	99.808	1042	1	1	1063	1912
AJ301908.1	99.808	1042	1	1	2804	1912
KU747653.1	99.808	1041	1	1	1049	1910
KU747552.1	99.808	1040	2	0	1057	1910
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KF435883.1	99.903	1036	1	0	1036	1908
KF435775.1	99.904	1037	0	1	1037	1908
KF435580.1	99.903	1036	1	0	1036	1908
KF435409.1	99.904	1037	0	1	1037	1908
KF435323.1	99.904	1037	0	1	1037	1908

AB710144.1	99.712	1041	3	0	1060	1906
EU686786.1	99.712	1041	3	0	1055	1906
EU686752.1	99.712	1042	1	2	1055	1906
EF221829.1	99.712	1042	2	1	1057	1906
KF435485.1	99.712	1041	2	1	1044	1905
EU379557.1	99.807	1038	1	1	1038	1905
KU747679.1	99.807	1037	1	1	1037	1903
KF436244.1	99.616	1042	3	1	1046	1901
AJ301909.1	99.616	1042	3	1	2804	1901
KF436326.1	99.616	1041	3	1	1049	1899
KF436242.1	99.616	1041	3	1	1048	1899
KF436238.1	99.616	1041	3	1	1045	1899
KF436117.1	99.616	1041	3	1	1044	1899
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KF435615.1	99.616	1041	3	1	1044	1899
KF435549.1	99.616	1041	3	1	1052	1899
KF435444.1	99.616	1041	3	1	1045	1899
EU686947.1	99.616	1041	3	1	1055	1899
EU294268.1	99.711	1038	2	1	1038	1899
KF436330.1	99.711	1037	2	1	1037	1897
KF435872.1	100	1027	0	0	1027	1897
KF435869.1	100	1027	0	0	1027	1897
KF435350.1	99.615	1040	3	1	1054	1897
KF435326.1	99.615	1040	3	1	1048	1897

JQ747666.1	99.615	1040	2	2	1057	1897
JX131331.1	99.52	1042	4	1	1091	1895
AJ301986.1	99.52	1042	4	1	1420	1895
AJ301977.1	99.52	1041	5	0	1812	1895
KF436343.1	99.52	1041	4	1	1049	1893
KF436305.1	99.52	1041	3	2	1044	1893
KF436106.1	99.52	1041	3	2	1044	1893
KF436077.1	99.52	1041	3	2	1044	1893
KF436402.1	99.903	1027	1	0	1027	1892
KF436348.1	99.903	1028	0	1	1028	1892

Table S2. Angle of midrib with the horizon for expanding and mature leaves of *A. blackiana* and *B. utile*. Measurements are from pairs of expanding and mature leaves collected simultaneously from the same individual. Sample size for each light treatment was ≥7 individuals for both species.

	A. blackiana		*B. utile*	
	Expanding leaves	Mature leaves	Expanding leaves	Mature leaves
Angle of midrib with horizon (mean ± SEM)	19 ± 1.9°	13 ± 1.2°	74 ± 2.0°	17 ± 1.9°
Comparison across leaf age	Paired Wilcoxon test P < 0.001, V = 462		Paired t-test P < 0.001, t(34) = 38.488	
Comparison across treatments	ANOVA P = 0.110, F(1,40) = 2.666	ANOVA P = 0.609 F(1,40) = 0.266	ANOVA P = 0.102 F(1,33) = 2.837	ANOVA P = 0.252 F(1,33) = 1.36

Table S3. Compounds associated with increased fungal inhibition. All compounds included exhibited significant ($P < 0.05$) fold-changes across the treatment comparisons listed, indicating an association with fungal growth inhibition. All statistical tests are Tukey's HSD.

***A. blackiana* expanding leaves**			
m/z $[M-H]^-$	Chemical class	Fold-change (P-value), SF/USUF+	Fold-change (P-value), SF/USUV-
387.1657	Hydroxybenzoic acid	N/A	4.7 (0.015)
***A. blackiana* mature leaves**			
236.0976	Alkaloid, phenol-based	5.9(0.010)	N/A
242.1764	Alkaloid, phenol-based	5.1 (0.002)	N/A
497.3333	Alkaloid, phenol-based	10.2 (0.004)	N/A

Figure S1. Experimental treatments. Top: Treatments USUV+ and USUV-; bottom: Treatment SF.

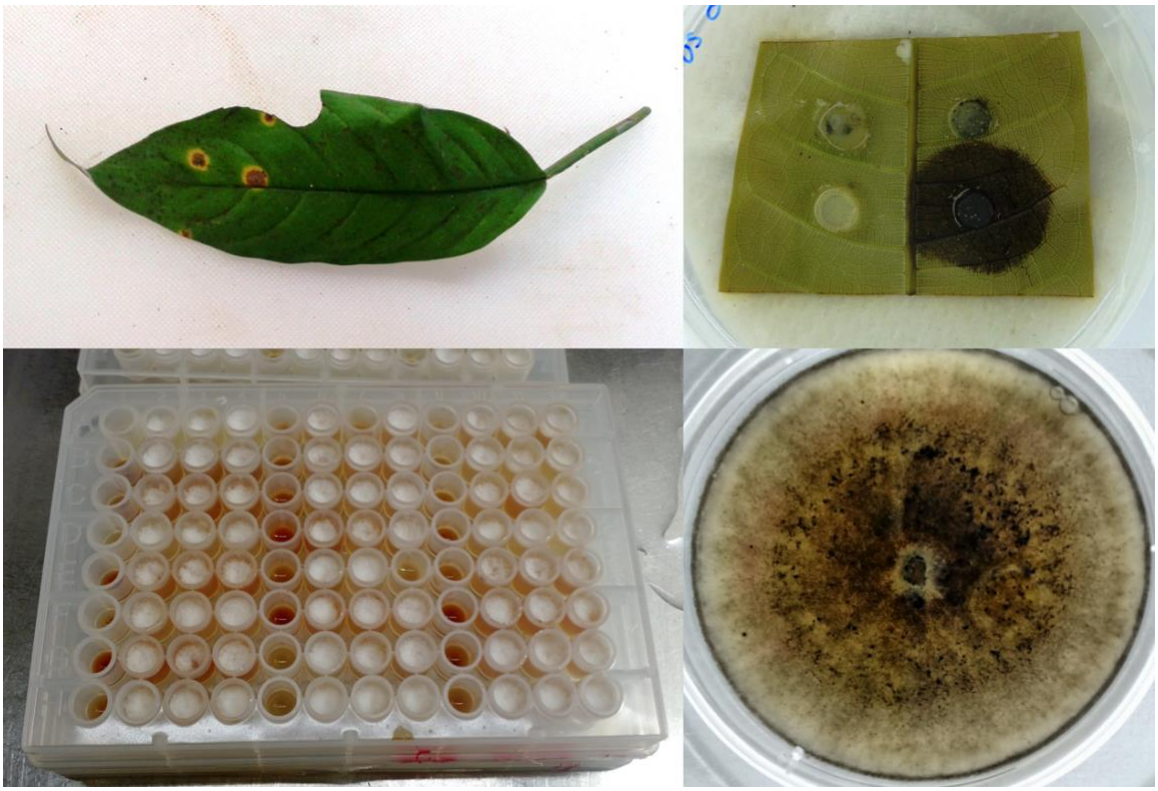

Figure S2. Fungal pathogen isolation and bioassays. Clockwise from top left: collection source; inoculations to verify pathogenicity; isolated culture; bioassay arrangement. First two photos by Mariana Franco.

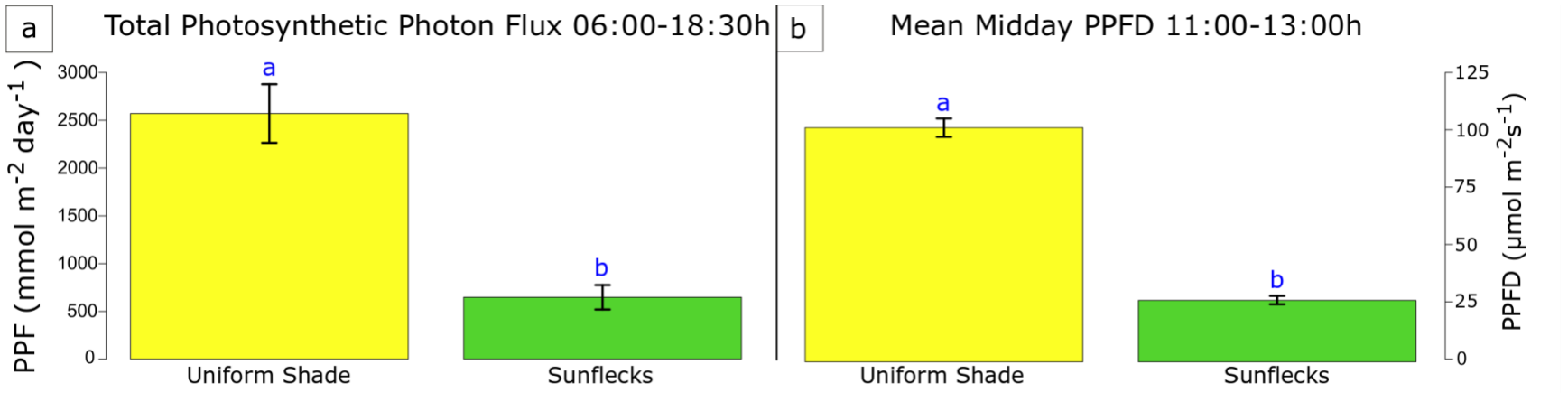

Figure S3. PAR conditions in uniform shade vs. sunfleck treatments, recorded 31 August – 17 September 2014. PAR conditions in high UVB and low UVB uniform shade treatments did not differ significantly; data shown are from the high UVB treatment. Significant differences between treatments at $P < 0.05$ are indicated by non-matching letters above error bars. Error bars indicate 95% confidence intervals.

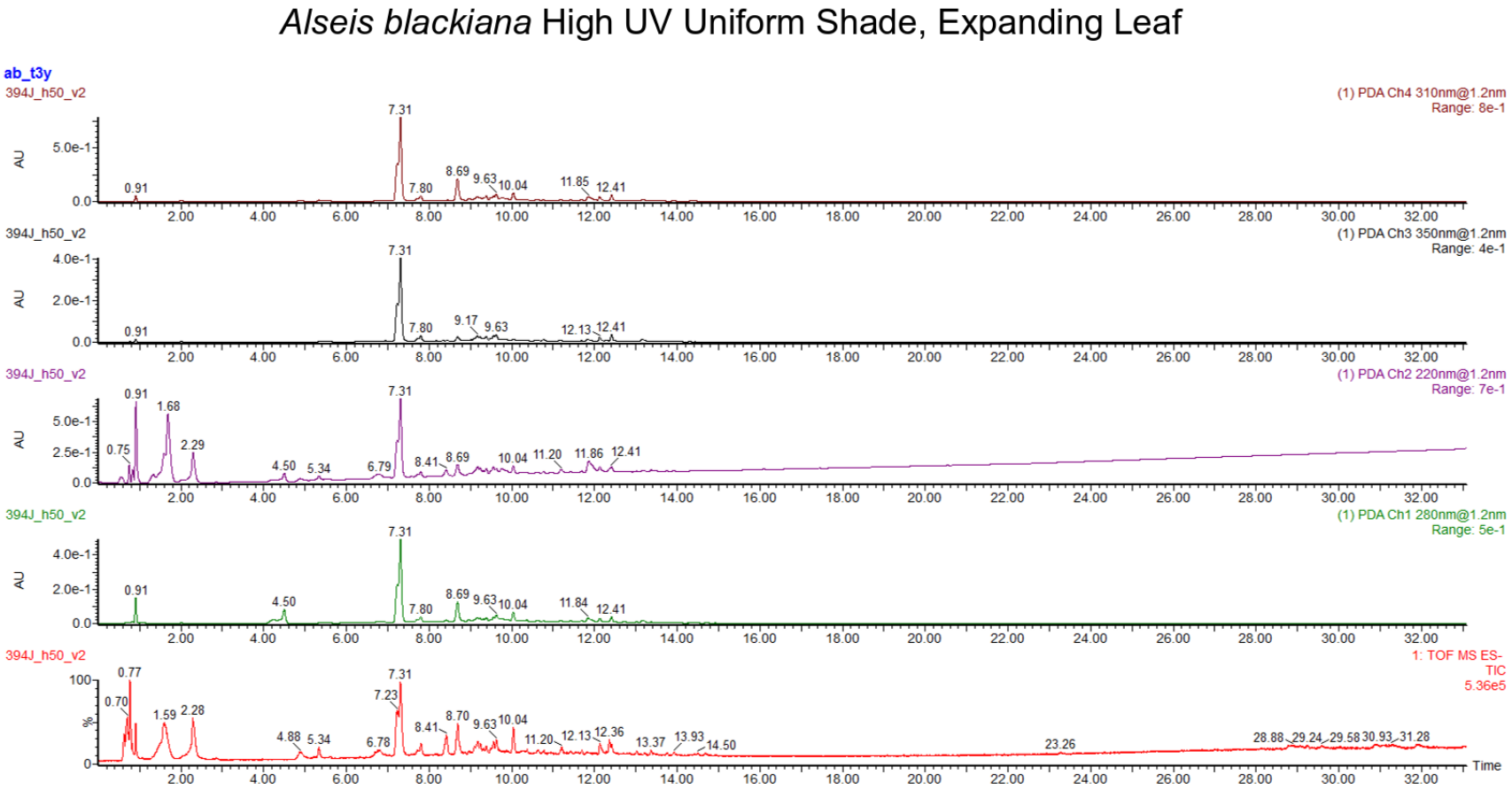

Figure S4a. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of an *A. blackiana* expanding leaf sample from treatment USUV+. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

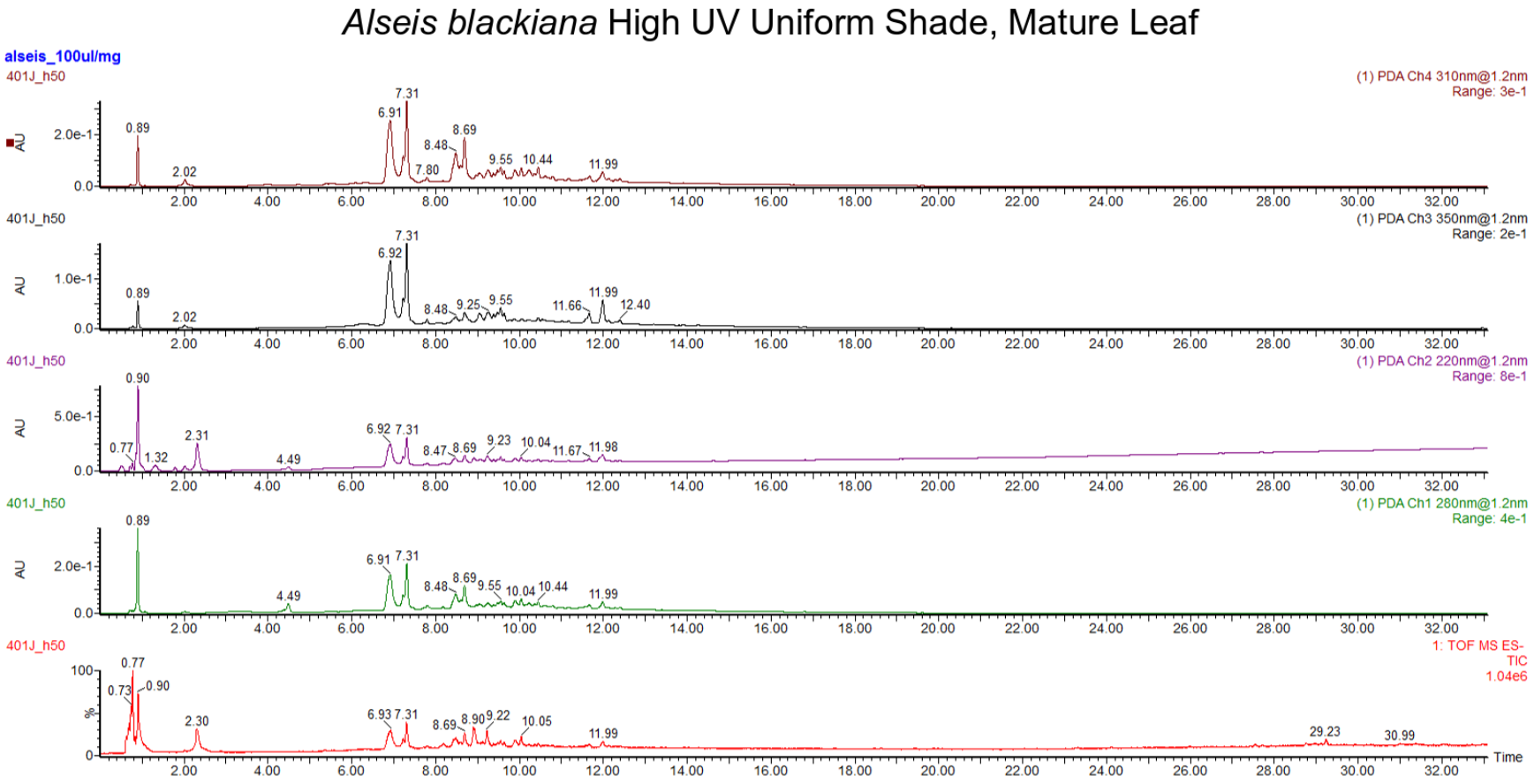

Figure S4b. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of an *A. blackiana* mature leaf sample from treatment USUV+. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

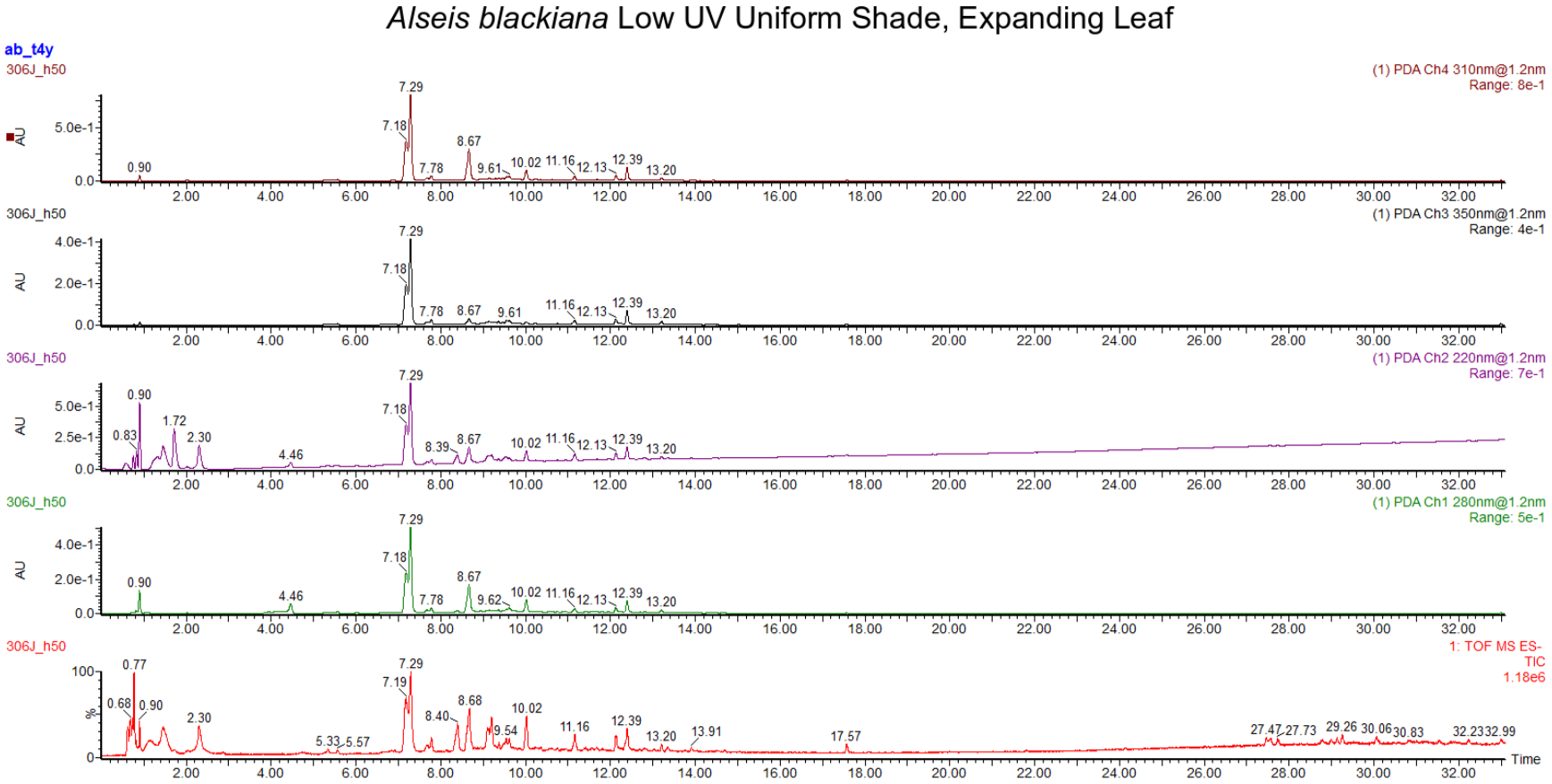

Figure S4c. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of an *A. blackiana* expanding leaf sample from treatment USUV-. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

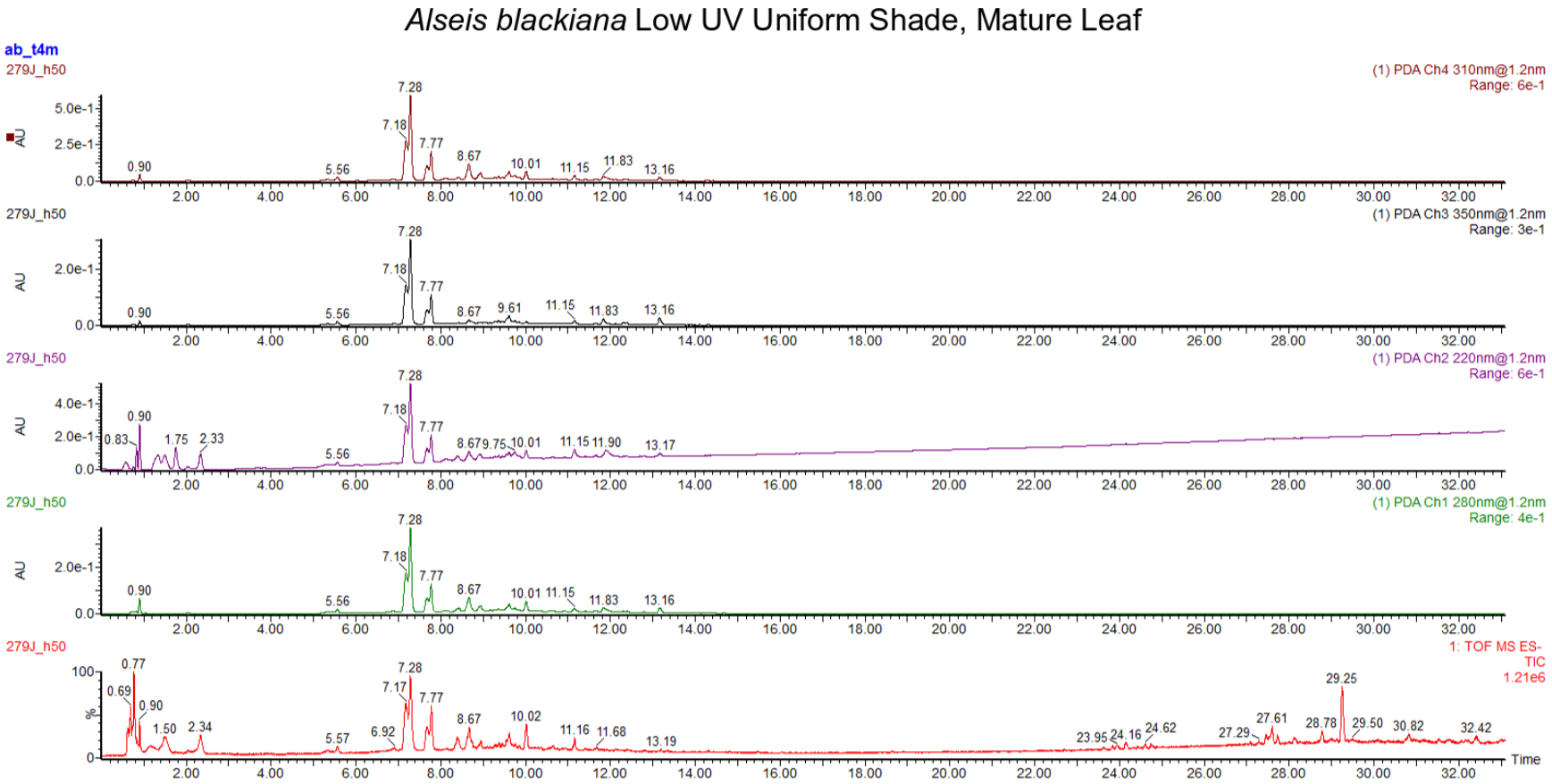

Figure S4d. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of an *A. blackiana* mature leaf sample from treatment USUV-. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

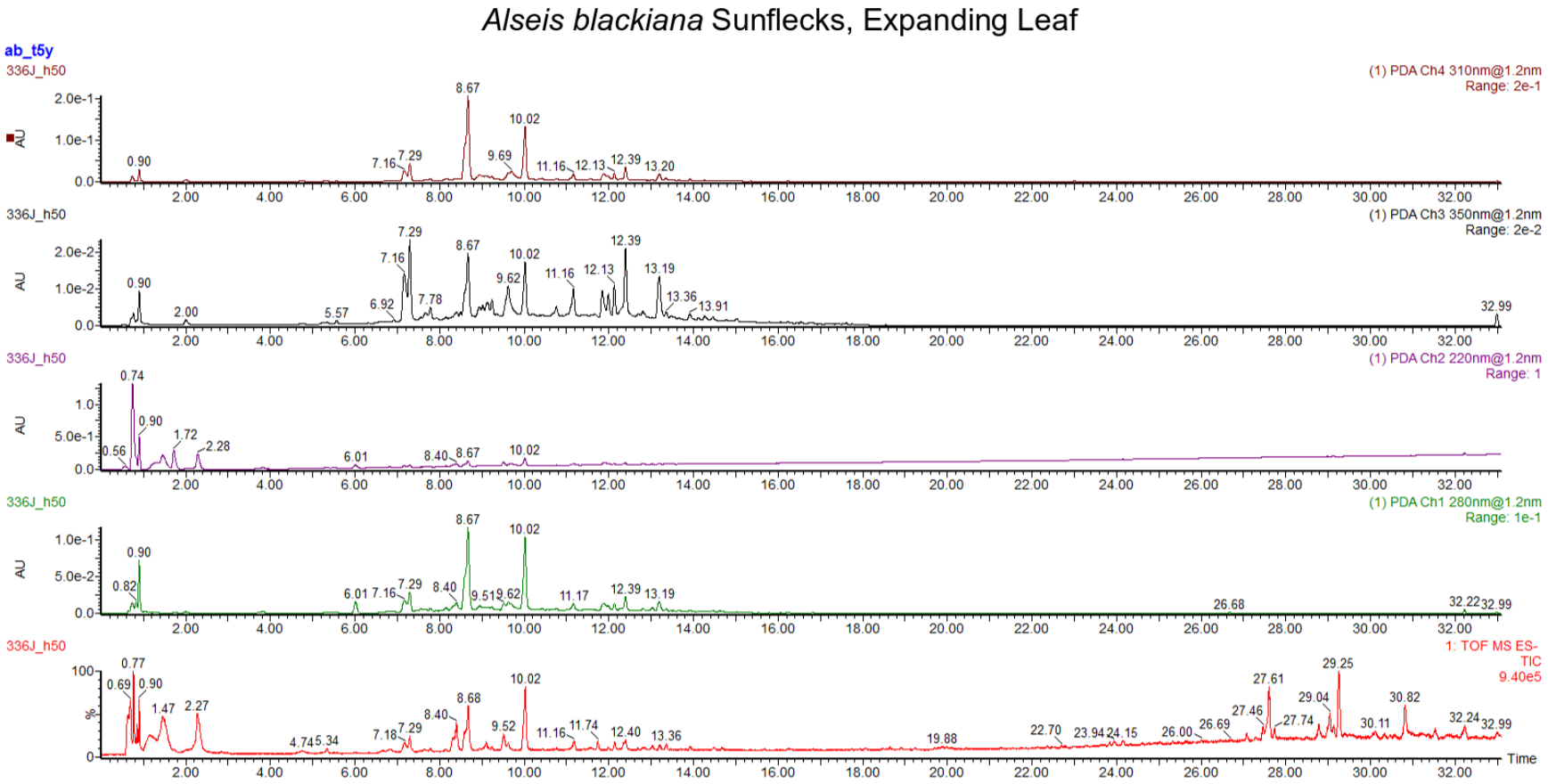

Figure S4e. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of an *A. blackiana* expanding leaf sample from treatment SF. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

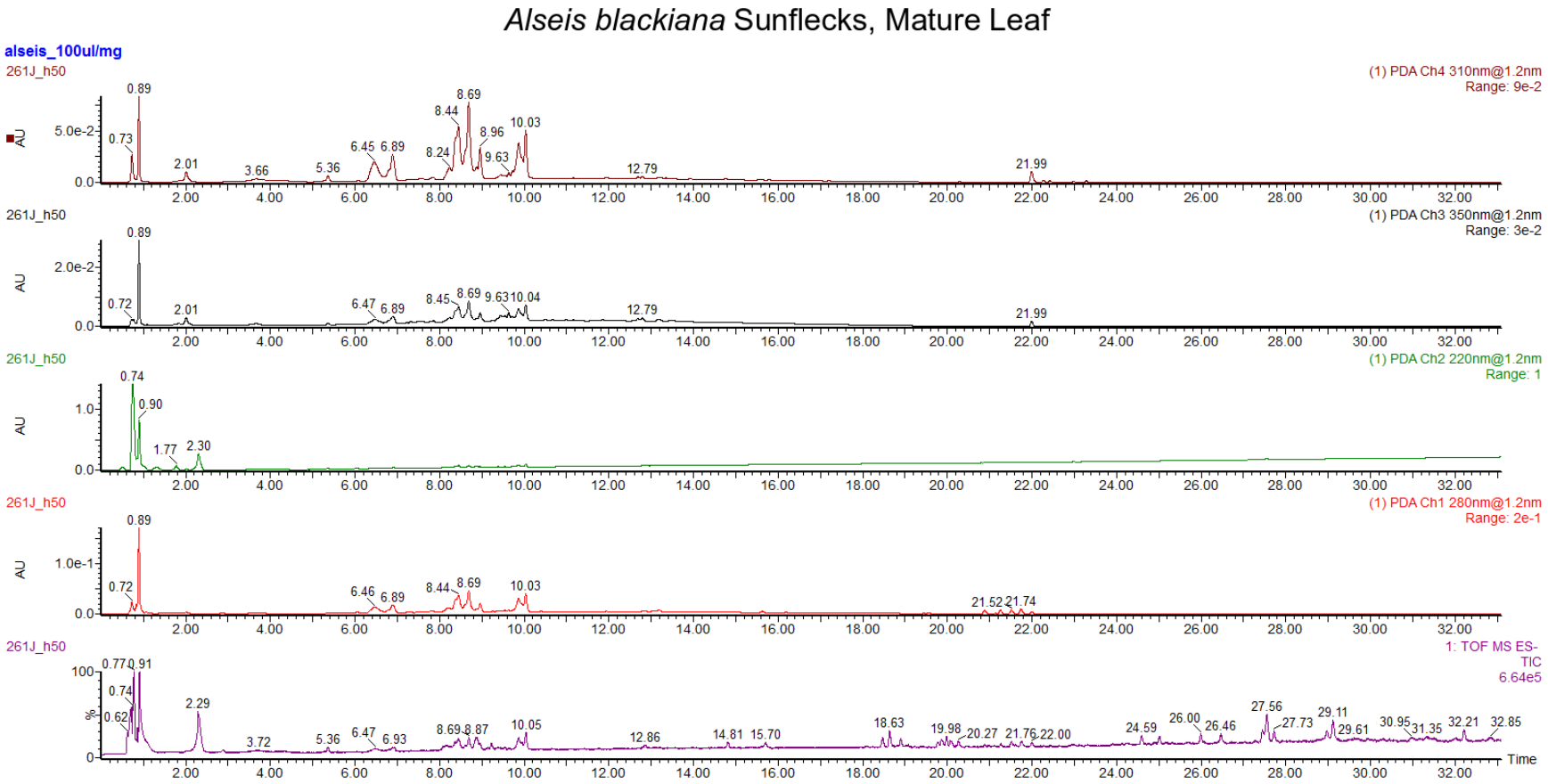

Figure S4f. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of an *A. blackiana* mature leaf sample from treatment SF. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

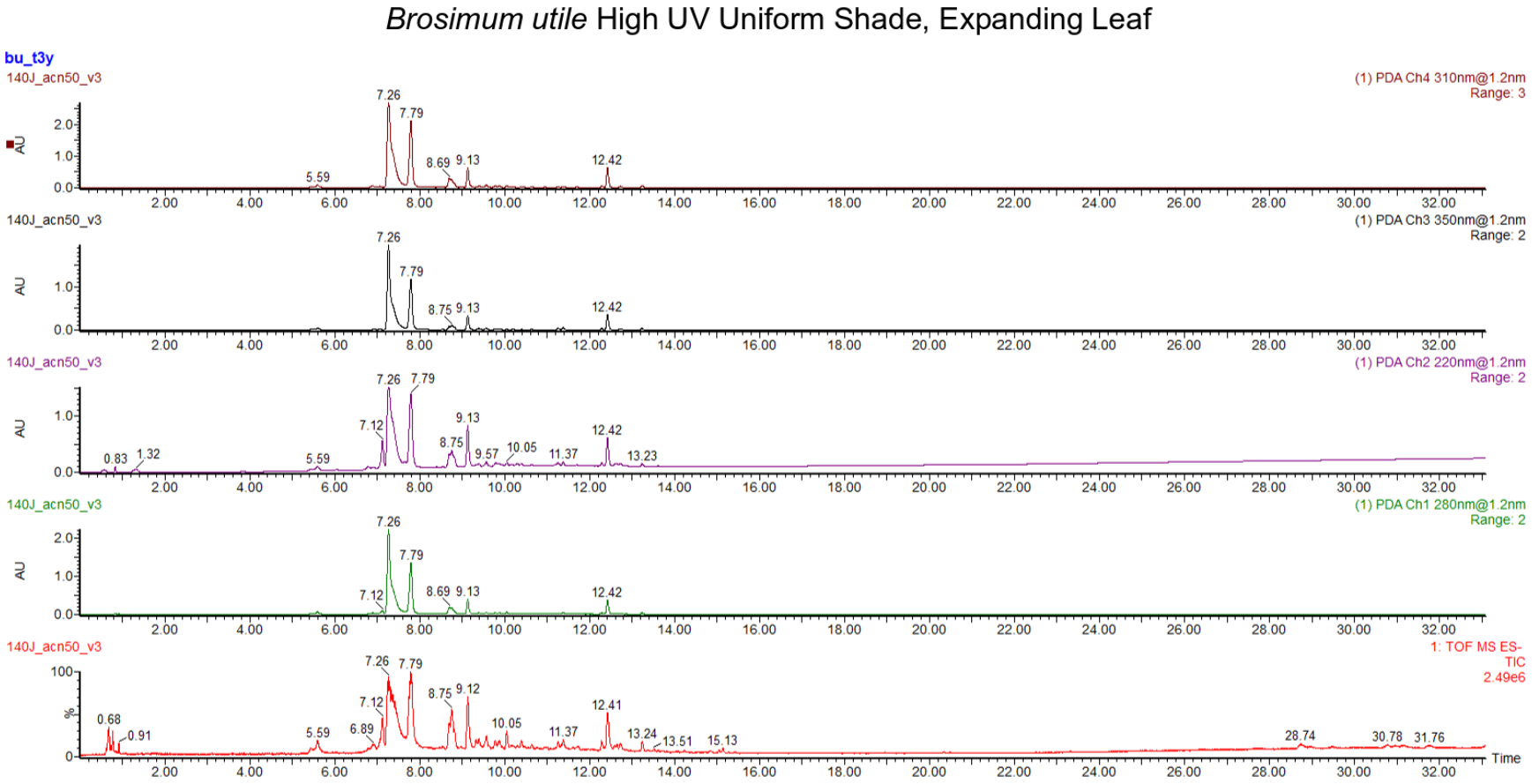

Figure S4g. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of a *B. utile* expanding leaf sample from treatment USUV+. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

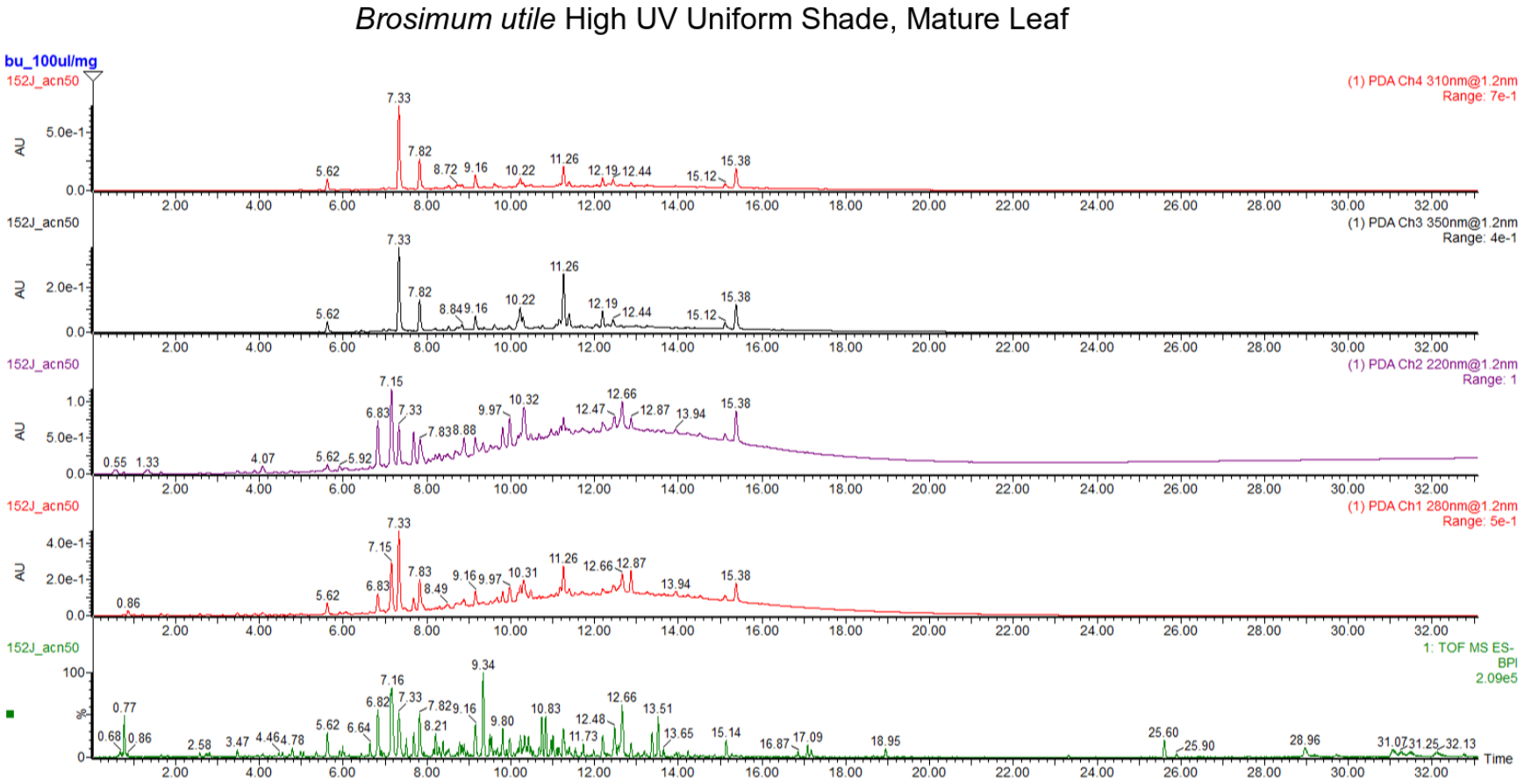

Figure S4h. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of a *B. utile* mature leaf sample from treatment USUV+. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

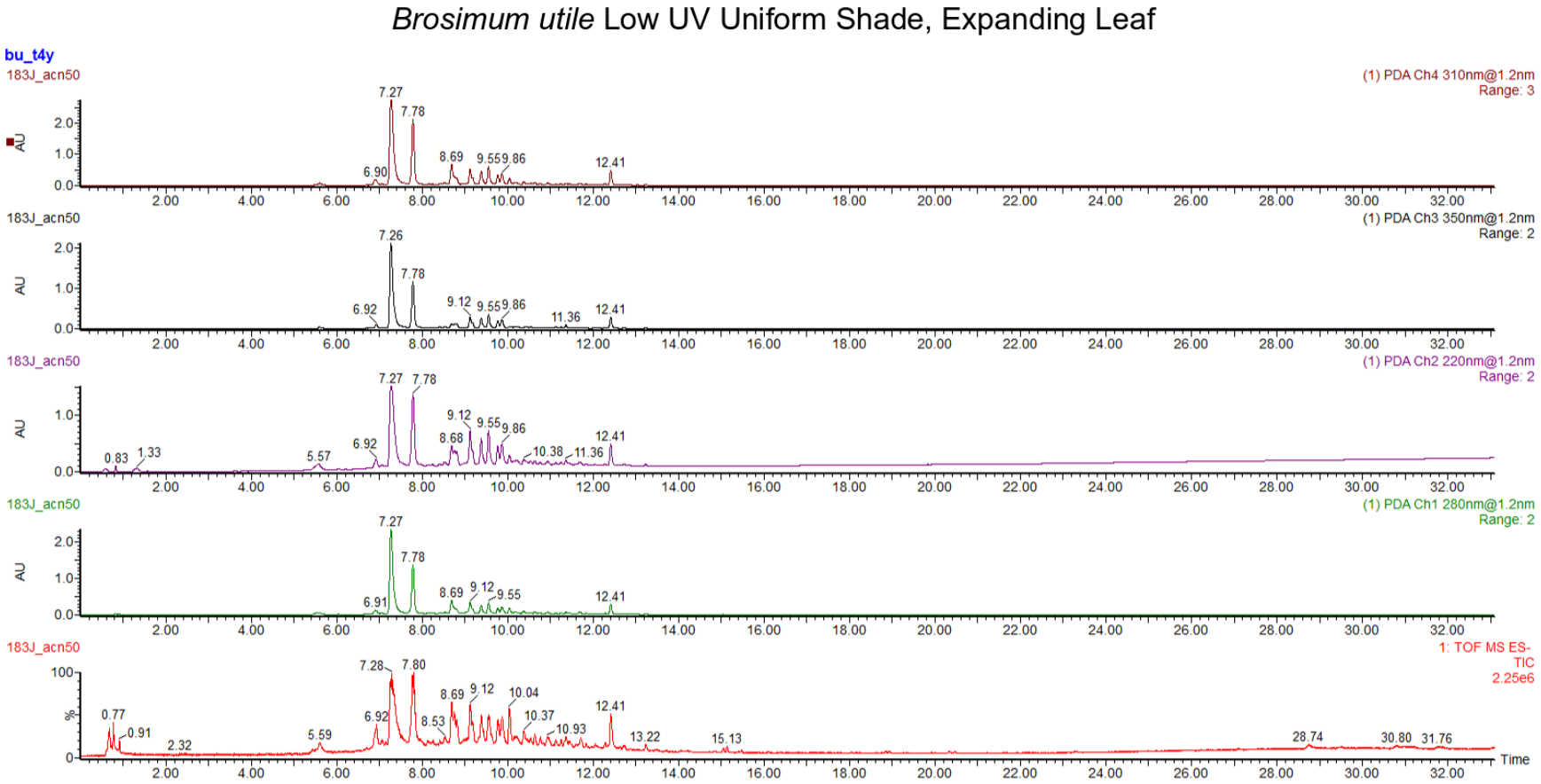

Figure S4i. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of a *B. utile* expanding leaf sample from treatment USUV-. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

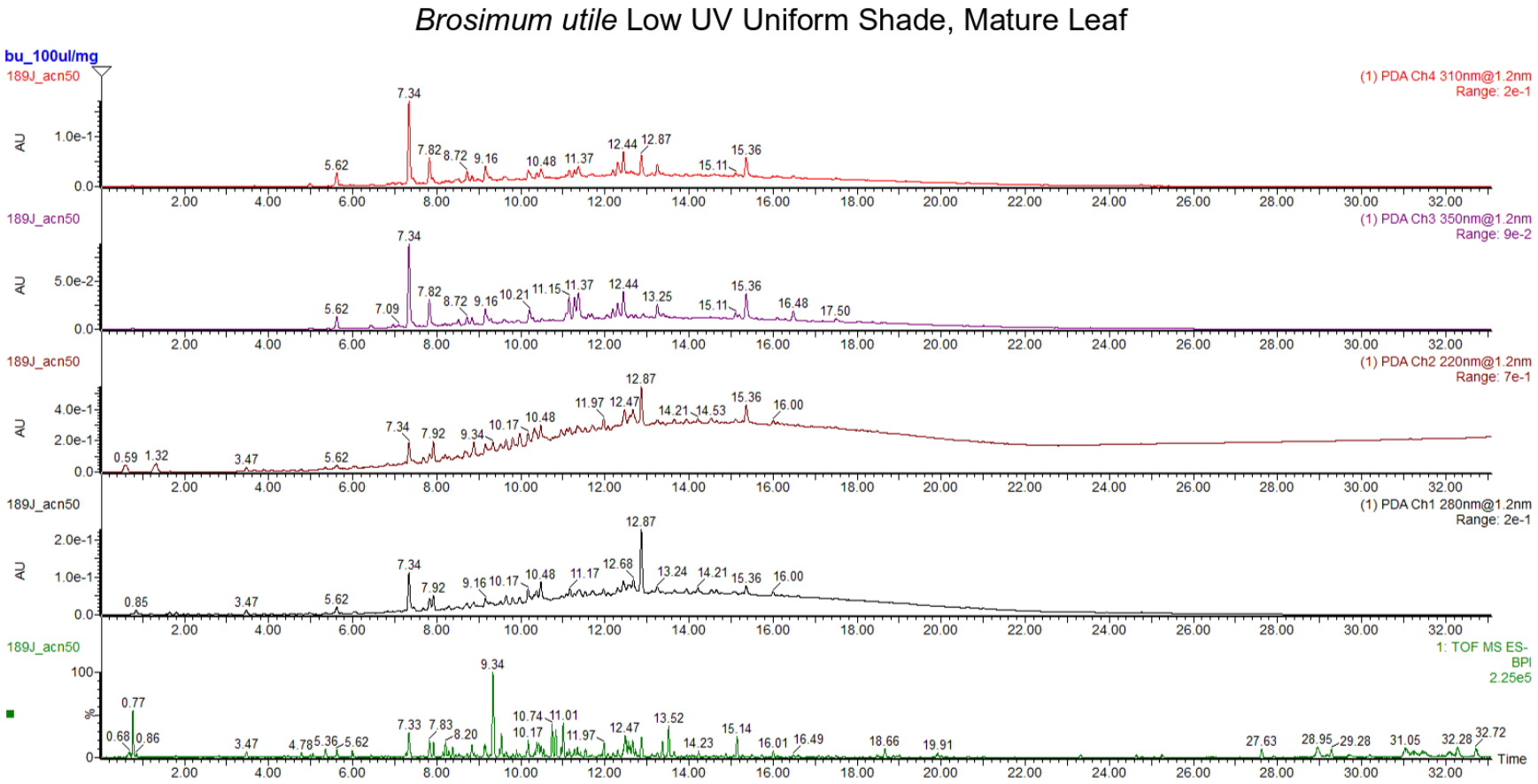

Figure S4j. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of a *B. utile* mature leaf sample from treatment USUV-. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

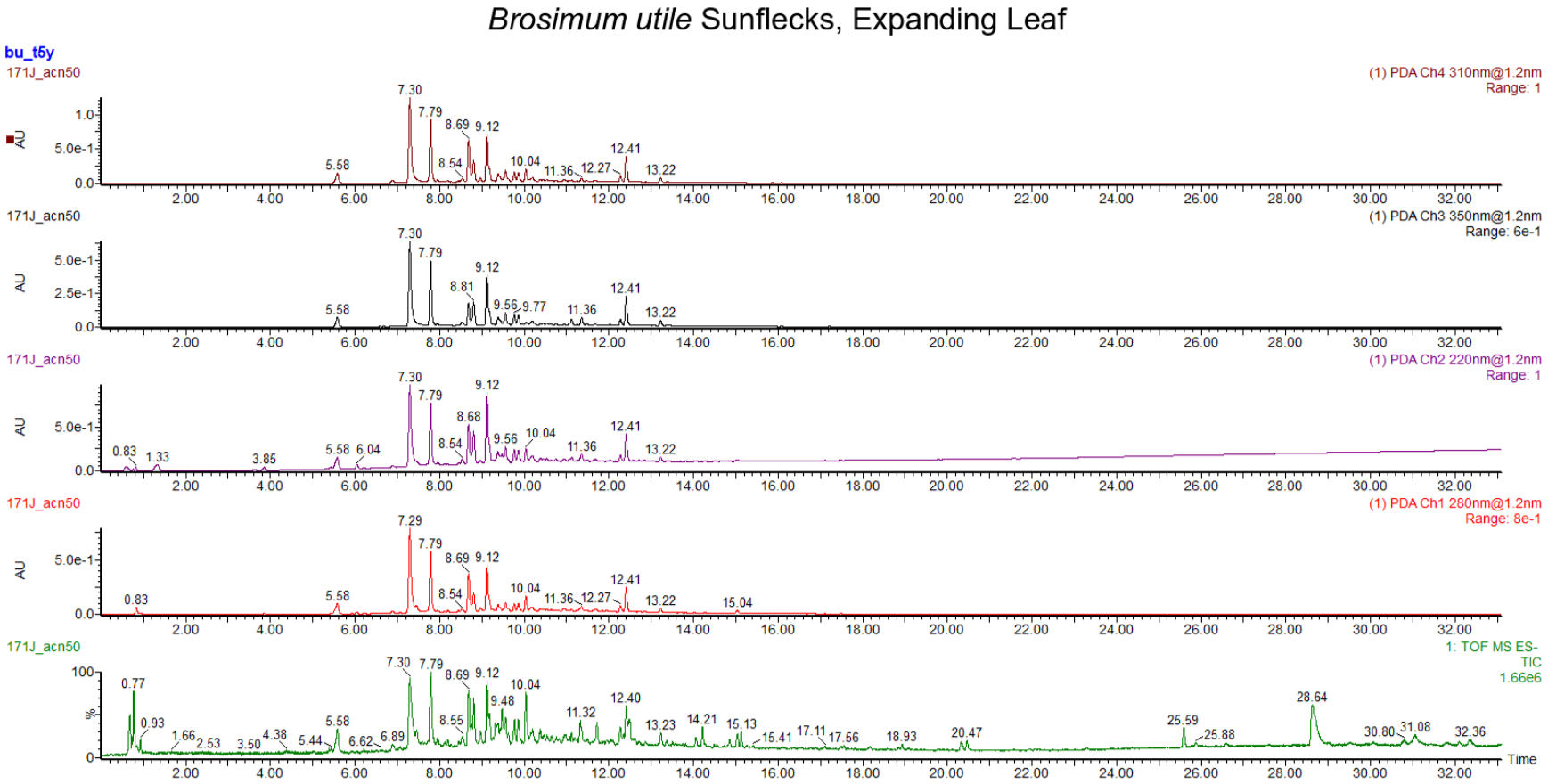

Figure S4k. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of a *B. utile* expanding leaf sample from treatment SF. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.

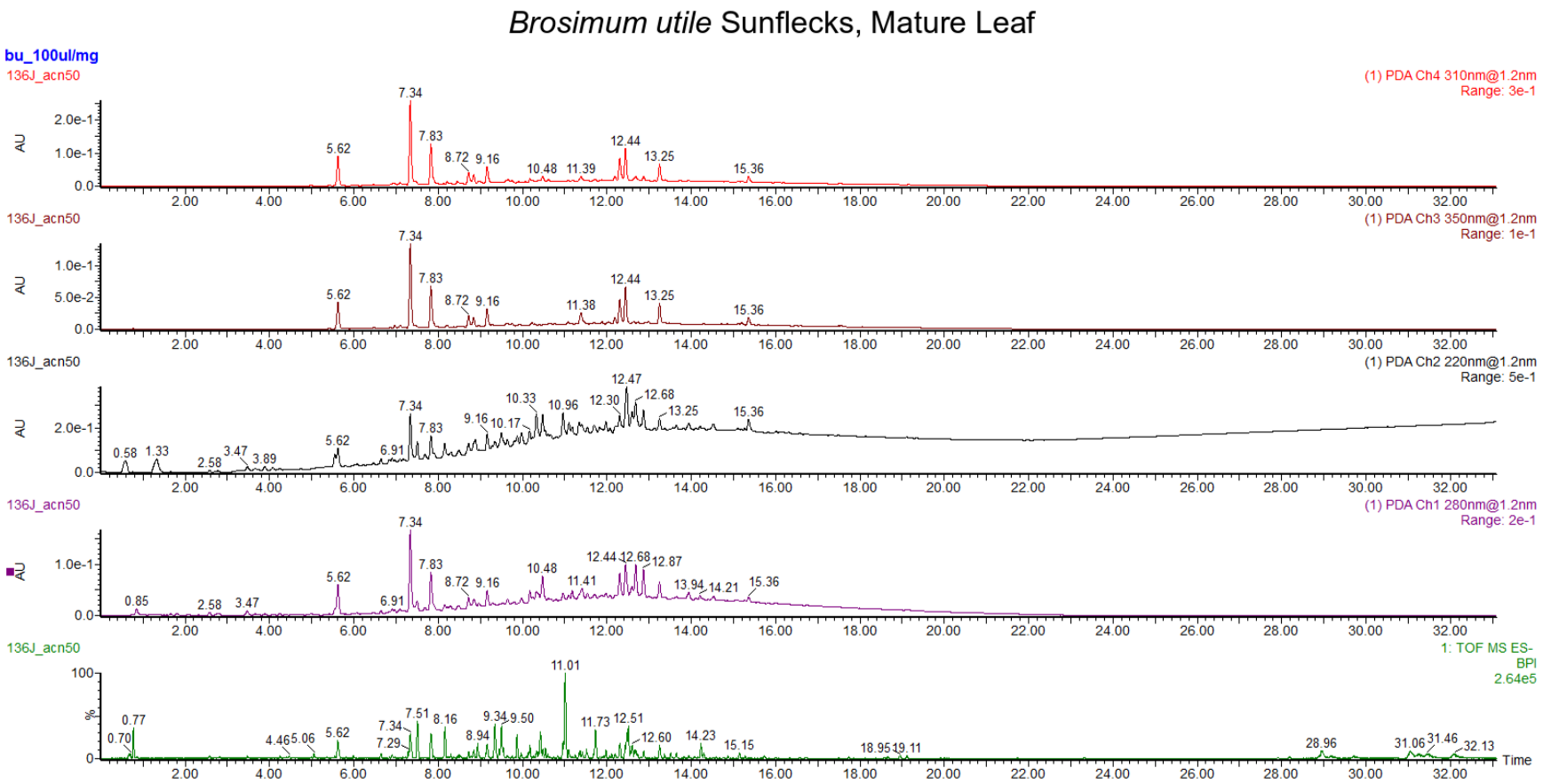

Figure S4l. UPLC-MS and photodiode array (PDA) profiles of the secondary metabolite extract of a *B. utile* mature leaf sample from treatment SF. Photodiode array profiles shown are (top to bottom) 310nm, 350nm, 220nm, and 280nm. UPLC-MS and PDA data were collected as described in Methods: Metabolomic analysis of secondary metabolites.