

Supplementary data

Supplementary Table S1. Loadings of component 1 and component 2 of Sparse Partial Least Squares - Discriminant Analysis (sPLS-DA). sPLS-DA clustering analysis was performed on metabolites in mature and young leaves of date palm seedlings grown in summer and winter climate. Bold values are the top 10 parameters determining of each components according to their absolute values. A143018, N-methyl trans-4-hydroxy-L-proline (2S,4R)-4-hydroxy-1-methyl pyrrolidine-2-carboxylic acid; A181001, code of an unknown metabolite in the Golm library; P, phosphate.

Parameters	Component 1	Component 2
DHAR activity-40 °C	-0.18511	0.065364
GR activity-25 °C	-0.17896	0.050415
H ₂ O ₂	0.17792	0.032746
GR activity-40 °C	0.17095	-0.03101
Tetradecanoic acid	0.1625	0.056636
Nicotinic acid	0.16078	0.063497
Dehydroascorbate reductase (DHAR) activity-25 °C	-0.16052	0.066613
Taxifolin	-0.15531	-0.09128
α -Tocopherol	0.15428	0.009136
Neu5Ac	0.15349	0.042711
cis-4-hydroxy-Cinnamic acid	-0.15079	0.009628
N-acetyl-Glutamate	-0.14829	0.003486
$\delta^{13}\text{C}$	0.14827	0.016857
Dodecanoic acid	0.14803	0.040896
Maleamate	-0.14674	-0.0185
Glucono-1,4-lactone	0.14305	0.003717
Salicylic acid	0.13613	0.071476
Shikimate	-0.13362	-0.10006
β -D-Galp-1,3-arabinose	0.13333	-0.02047

Lumichrome	-0.13288	-0.00374
2,5-Dihydroxymethyl-3,4-dihydroxypyrrolidine	-0.12953	0.02842
trans-4-hydroxy-Cinnamic acid	-0.12923	0.025422
Epicatechin	-0.12727	-0.08489
trans-Caffeic acid	0.12658	0.001381
Cellobiose	0.12164	-0.05763
9,12,15-octadecatrienoic acid	-0.11969	-0.04894
Glycine	-0.11839	0.071341
9,12-octadecadienoic acid	-0.11838	-0.05804
Alanine	-0.11249	0.12216
4-hydroxy-Benzoic acid	0.11199	0.017184
Leaf hydration	-0.11195	0.0861
γ -Glutamylcystein (γ -EC)	-0.10997	0.005147
Arginine	-0.1091	0.081617
Sorbitol	-0.10865	-0.13252
Hexadecanoic acid	-0.10827	-0.0489
Aspartate	-0.10813	-0.07459
A143018	-0.10716	0.085696
Serine	-0.10462	0.011137
Succinate	0.10367	-0.05022
Hexanoic acid	0.098646	-0.01318
5-Hydroxypentanoic acid	0.098505	-0.03318
trans-Sinapic acid	0.09817	0.13243
Fructose	0.09709	-0.07415
Fumarate	0.092531	0.12891
Urea	-0.09115	-0.03897
β -Sitosterol	0.089306	0.026823
Threonine	-0.088909	0.10118
Pyrophosphate	-0.08665	-0.12621
Xylose	-0.086377	-0.12767
Heptadecanoic acid	-0.085498	-0.0269

D- α,α -Trehalose	0.085339	-0.02909
Lactose	0.084685	-0.13127
Total amino acid-N	-0.084424	0.15247
Total nitrogen (N)	-0.082126	0.053746
myo-Inositol	-0.08199	-0.03243
Stearyl alcohol	0.080309	0.031293
C/N	0.079235	-0.0602
Structural N	-0.07706	0.046865
Proline	-0.073873	-0.06074
Meglutol	-0.072757	-0.05815
Catechin	-0.072737	-0.12127
Raffinose	0.069065	0.1748
Pyruvate	-0.068302	0.060501
5,8,11,14-Eicosatetraenoic acid	0.068094	0.14509
N-Acetyl-ornithine	-0.068077	-0.15897
Glucose-6P	-0.063654	-0.06592
Phospahte	-0.062993	0.09664
Arbutin	0.061935	-0.09686
Malate	-0.06146	0.083802
Laminaribiose	0.059887	-0.08113
GSSG/GSH	-0.058257	-0.09785
trans-Ferulic acid	-0.055155	-0.0208
Phytol	0.049307	-0.0189
Protein-N	-0.047824	0.008191
$\delta^{15}\text{N}$	-0.047059	0.07117
Oxidised glutathione (GSSG)	-0.046951	-0.0674
Galactonic acid	0.044966	-0.09904
Phenylalanine	-0.043598	0.090628
A181001	-0.043398	0.10145
Quinate	0.043382	0.049115
Lactate	-0.042804	-0.0065

Erythrose	-0.040849	0.084227
Chlorophyll a/b	-0.040017	-0.18752
Monomethyl phosphate	-0.039407	-0.00525
Citric acid	-0.038999	0.13762
Galactose	0.036482	-0.12214
β -Alanine	-0.036052	0.13832
6-Kestose	-0.036	0.12487
Pyroglutamate	-0.031678	0.067819
Reduced Ascorbate	0.03138	-0.11471
Tryptophan	-0.030969	0.10607
Chlorophyll a	-0.030029	-0.01669
Sucrose	0.027357	0.001757
Glycerol-3P	0.026366	-0.16874
Guaiacylglycerol	-0.025964	0.040446
Lysine	0.02518	-0.23102
Total ascorbate	0.024661	-0.11987
Sorbose	0.023942	-0.2342
Glyceric acid	-0.023927	-0.11944
Sulfate	0.022094	0.053729
Galactinol	0.020083	0.22102
Carotene	0.019993	-0.02927
Chlorophyll b	-0.019968	0.034693
Gamma-aminobutyric acid (GABA)	-0.018896	0.17439
Dehydroascorbate (DHA) dimer	-0.014371	-0.15656
Cysteine	-0.0099783	-0.03052
Glutamine	-0.0095171	0.17167
Total glutathione (GSH)	0.0087617	0.043002
Glutamate	0.0082636	-0.03609
Nitrate	-0.0071263	0.094346
Isoascorbic acid	-0.0060667	-0.1032
Glucose	-0.004993	-0.07612

Lyxonic acid	0.0028657	0.13311
Phosphoric acid	-0.0027951	0.18938
Total carbon (C)	-0.0019774	-0.04571
Stigmasterol	-0.0014708	-0.03312