

Table 4 Metabolites in Arabidopsis rosettes in the dark, and under light, with 73, 210 and 485 ppm CO₂ (mean ± SD, n = 3)

Metabolite	Amount (nmol g FW ⁻¹)				Stoichiometry	T _{0.5} sec ⁻¹
	Dark	Light, with a CO ₂ concentration (ppm) of				
		73	210	485		
Aconitate	39.7 ± 2.5	14.3 ± 2.4	19.1 ± 4.7	22.8 ± 1.6		
ATP ^e	91.7 ± 9	108 ± 9	117 ± 5	101 ± 4	3 ^a	0.28
ADP	26.0 ± 3	29.2 ± 3.2	25.0 ± 1.5	24.3 ± 1.9	3 ^a	0.07
AMP	17.9 ± 0.3	8.34 ± 1.74	7.53 ± 0.82	8.66 ± 0.59		
ADPG	0.002 ± 0.002	0.167 ± 0.011	0.607 ± 0.088	1.021 ± 0.097	0.034 ^b	0.50
Aspartate	1647 ± 84	935 ± 48	1532 ± 127	1642 ± 107		
Citrate	2748 ± 50	1190 ± 59	1494 ± 127	1688 ± 117		
DHAP	3.6 ± 0.5	40.6 ± 1.7	51.7 ± 6.7	57.3 ± 4.2	2 ^a	0.24
F6P	33.4 ± 2.3	87.5 ± 3.9	113 ± 7	128 ± 8	0.33 ^a	3.23
FBP	0.768 ± 0.077	16.7 ± 1.7	23.4 ± 1.8	31.2 ± 2.4	0.33 ^a	0.79
Fructose ^e	357 ± 38	449 ± 47	355 ± 120	374 ± 68		
G1P	7.23 ± 0.45	11.9 ± 0.1	11.0 ± 0.7	11.4 ± 1.2	0.1 ^b	1.90
G3P	37.5 ± 0.9	45.2 ± 2.2	47.3 ± 5.7	47.5 ± 2.5		
G6P	95.4 ± 4	189 ± 8	239 ± 16	272 ± 15	0.1 ^b	45.33
Glucose ^e	1155 ± 34	1420 ± 86	1195 ± 21	1168 ± 70		
Glutamate	3973 ± 225	4256 ± 138	4208 ± 465	4424 ± 319		
Glycerate	206 ± 9	143 ± 6	316 ± 15	290 ± 11		
Isocitrate	67.7 ± 2.9	39.4 ± 3	48.0 ± 4.1	49.9 ± 2.2		
Malate	4018 ± 175	2778 ± 142	3523 ± 310	3222 ± 185		
NAD	18.8 ± 0.5	19.4 ± 0.8	17.0 ± 0.4	14.0 ± 1.2		
NADP	2.96 ± 0.06	5.45 ± 0.90	4.65 ± 0.59	3.16 ± 0.35	2 ^a	0.01
2-OG	125 ± 7	130 ± 4	113 ± 11	90.4 ± 2.6		
3PGA ^e	142 ± 5	153 ± 7	198 ± 11	168 ± 15	2 ^a	0.70
PEP ^e	43.2 ± 1.4	32.0 ± 3.1	39.2 ± 1.5	43.5 ± 1.6		
Pyruvate ^e	31.3 ± 10.4	38.8 ± 13.7	22.6 ± 3	25.8 ± 4.8		
R5P	1.29 ± 0.24	3.40 ± 0.40	3.53 ± 0.75	3.28 ± 0.83	0.33 ^a	0.08
RuBP	4.29 ± 0.8	124 ± 6	98.6 ± 1.1	118 ± 11	1 ^a	0.98
S6P ^{abc}	0.247 ± 0.090	0.466 ± 0.004	0.847 ± 0.043	0.985 ± 0.109	0.07 ^b	0.23
S7P	96.6 ± 5.1	57.7 ± 2.9	79.9 ± 5	87.5 ± 4.3	0.33 ^a	2.21
SBP	0.954 ± 0.237	29.4 ± 3.2	32.6 ± 2.1	27.9 ± 2.4	0.33 ^a	0.70
Shikimate	35.4 ± 1.6	31.4 ± 3.9	38.7 ± 1.9	34.1 ± 3.3		
Succinate	227 ± 8	112 ± 9	139 ± 10	122 ± 7		
Sucrose ^e	3036 ± 95	3014 ± 108	3702 ± 170	3510 ± 255		
Starch ^{e*}	40.3 ± 1.7	35.3 ± 0.6	36.0 ± 0.4	38.3 ± 1.6		
T6P ^{abc}	0.108 ± 0.018	0.131 ± 0.002	0.125 ± 0.009	0.120 ± 0.007		
UDPG	117 ± 3	124 ± 7	144 ± 12	151 ± 4	0.07 ^b	35.95
X5P+Ru5P	3.50 ± 0.2	30.3 ± 7	33.3 ± 6.1	39.1 ± 1.6	1 ^a	0.33
inorganic C	69.1	9.0	25.9	53.9	1 ^b	0.78

Metabolites were measured by IPC-MS/MS, except those indicated as ^e and ^{abc}, which were measured by enzymatic assays or AEC-MS/MS, respectively. Values are nmol g FW⁻¹ (except starch*, μmol glucose-equivalents g FW⁻¹). Turnover times (T_{0.5}) for metabolites in the Calvin cycle, and starch and sucrose synthesis, under light with 485 ppm CO₂ were calculated as described in Experimental procedures, using the reaction stoichiometries indicated, with rates of RuBP regeneration (V_c + V_o) and net assimilation (A) of 60 and 30 μmol m⁻² sec⁻¹, respectively (see Figure 2), or with a conversion factor of 0.2 mg FW mm⁻², equivalent to 64 nmol RuBP g FW⁻¹ sec⁻¹ and 34 nmol CO₂ g FW⁻¹ sec⁻¹. The total leaf inorganic carbon content is calculated as described in the Experimental procedures.

^aCalvin cycle intermediates: the number of turnovers per molecule of RuBP synthesized.

^bEnd-product synthesis: number of turnovers per molecule of CO₂ fixed, taking into account the number of molecules of carbon in the metabolite and the stoichiometry of the synthesis pathway.