## Supporting Information

Table S1. Technical reproducibility of fluorophore instrument in measuring the chemical oxidation of cysteine across three separate experiments and for 30 sample tubes during each experiment.
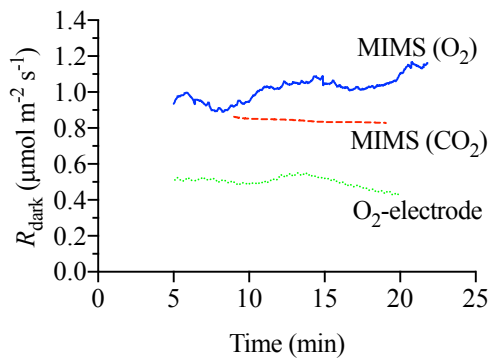
	Experiment 1	Experiment 2	Experiment 3
O_2 consumption (% air h^{-1})	1.87	2.00	1.65
Standard deviation (% air h^{-1})	0.10	0.16	0.18
Coefficient of variation (%)	5.55	8.22	10.67
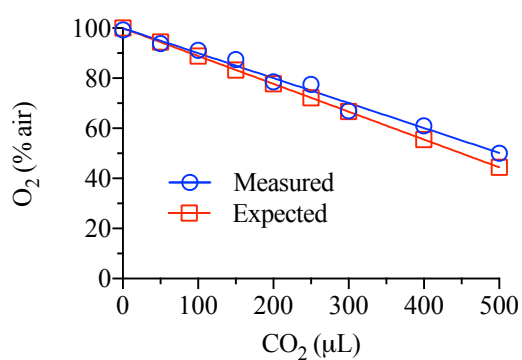
Figure S1. The measured (blue open circles) and expected (red open squares) depletion of O_2 (given as a % of O_2 relative to air) though replacement of air with known volumes of pure CO_2 gas in a 900 µL sample tube. The measured depletion values were linear ($r^2=0.99$) and had a slope of -0.0996 similar to the expected depletion rate of -0.1111.

Figure S2. A representative 46-day-old wheat plant harvested for whole-plant respiration analysis by dissection into individual leaves, stem and roots and placement in sample tubes and analysis of O_2 consumption on the Q2 oxygen sensor.

Figure S3. Derived respiration rates in the dark (R_{dark}) calculated from a 5 min running slope measured between 5 and 20 min from experiment initiation measured by membrane inlet mass spectrometry (MIMS) on an O_2 consumption (blue solid line), CO_2 evolution (red dashed line), or by O2-electrodes (dotted green line) after placing wheat leaf disks in the measuring cuvette.