

Supplemental material S3

Time-kinetics of volatiles released during light-dark transients from aspen (*Populus tremula*) leaves of different age

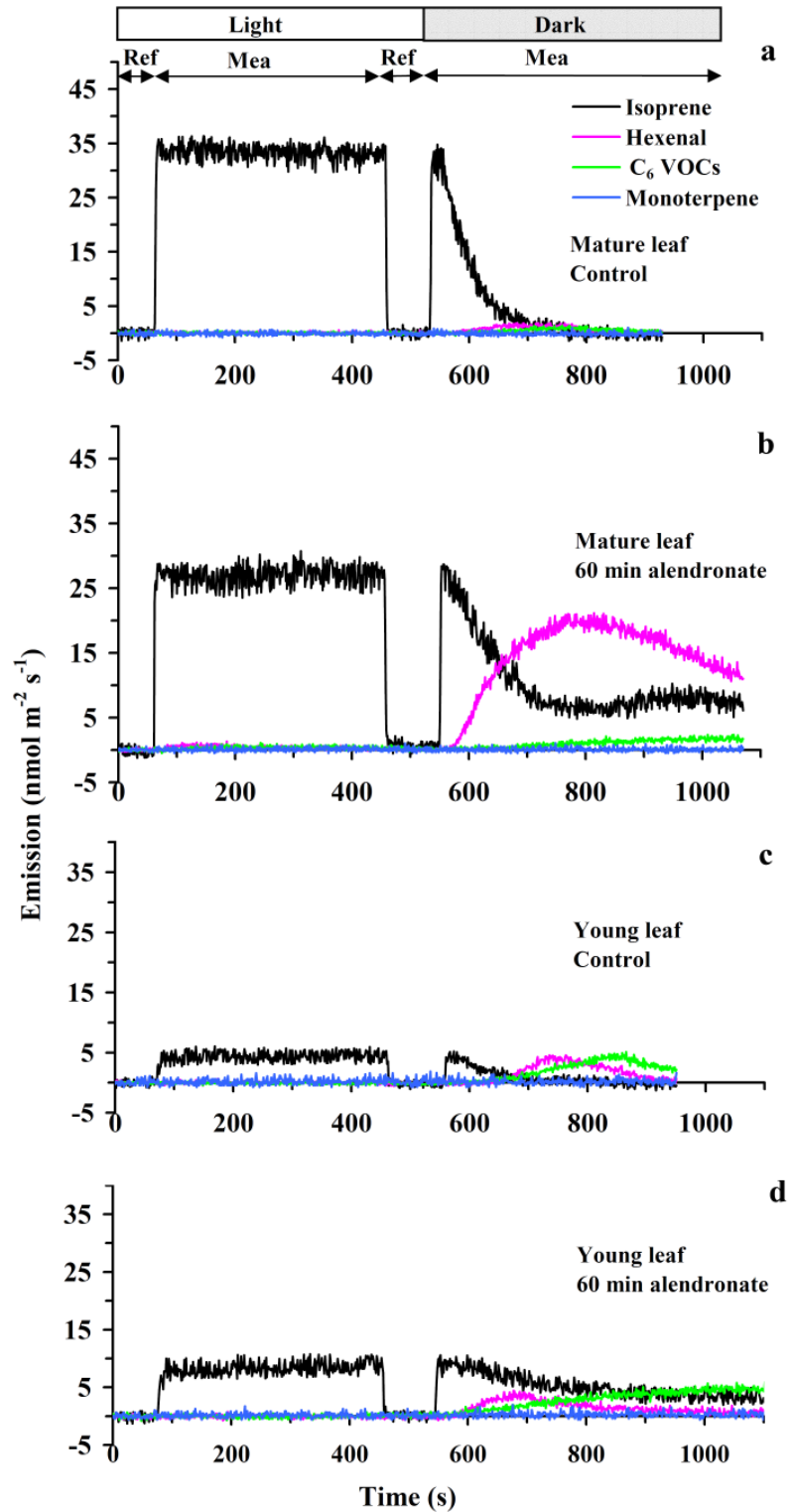


Figure S3.1 Illustration of the kinetics of volatiles released during light-dark transients from mature (a, b) and young (c, d) control (a, c) and alendronate-treated aspen (*Populus tremula*) leaves. The transients demonstrate periods of measurement of reference lines (Ref) and foliage (Mea). Alendronate is a specific inhibitor of prenyltransferases, in particular, geranyl diphosphate (Lange et al., 2001; Burke et al., 2004) and farnesyl diphosphate synthase (Bergstrom et al., 2000; Burke et al., 2004). The leaf was maintained at a quantum flux density of $650 \mu\text{mol m}^{-2} \text{s}^{-1}$, leaf temperature of $30 \text{ }^\circ\text{C}$ and ambient CO_2 concentration of $360 \mu\text{mol mol}^{-1}$ until a steady-state isoprene emission rate was observed. At $t = 550 \text{ s}$, light was switched off, leaf was simultaneously returned to the reference channel and dark release of volatiles was measured. The measurements were conducted with a high-sensitivity proton-transfer reaction mass spectrometer (PTR-MS) and in addition to protonated isoprene ($m/z = 69$), also masses corresponding to monoterpenes ($m/z = 137$) and lipoxygenase pathway volatiles (LOX), main fragments of hexenals ($m/z = 81$) and other C6 volatiles ($m/z = 83$, sum of hexenols, hexanal, and hexenyl acetates) were measured following Graus et al. (2004). Dark release of these lipoxygenase volatiles has been studied in detail in grey poplar (*P. x canescens*) and suggested to reflect disturbances generated by light-dark transients with corresponding release of free polyunsaturated fatty acids and their oxidation by lipoxygenases (Graus et al., 2004). The kinetics and magnitude of the release of LOX volatiles from the control leaves in our study broadly corresponds to the results of Graus et al. (2004), but the LOX emissions in alendronate-inhibited leaves were larger and continued for a longer period.

References

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