**Effect of PAR intensity and CO₂ concentrations on the emission of Volatile Organic Compounds from Australian native plants**

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**Introduction**

- What volatile organic compounds are emitted from Australian native plants?
- What is the relationship between BVOC emissions of Australian natives, PAR and atmospheric CO₂?

Volatile Organic Compounds are defined as all gas-phase organic compounds, except CO₂ and CO

- Biogenic VOC (BVOC’s) emissions are approximately 10 times greater than anthropogenic VOC emission.
- To account for BVOC’s in global climate models, we must understand the relationship between BVOC emissions and the factors which affect their emission from plants (e.g. light, temperature).
- Relationship between isoprene emissions and Photosynthetically Active Radiation (PAR) is well understood (Equation 1)

\[ \alpha_{PAR} = \frac{C_{1}}{\sqrt{1 + \alpha_{PAR}}} \]  

Equation 1

- Southern hemisphere plants are currently understudied

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**Experimental Apparatus**

- A glass chamber will be employed to obtain BVOC’s emitted from the plants without the need to cut the branch from the tree.
- Relative humidity, temperature, PAR and CO₂ concentrations within the chamber will be regulated
- Solid-Phase Microextraction (SPME) will be used to collect the emitted BVOC’s

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**Photosynthetically Active Radiation (PAR)**

- The PAR intensity can be controlled by raising or lowering the lamp or varying the number of globes operated

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**Analysis**

- GC-FID calibration
- Efficiency of the Solid-Phase Microextraction (SPME) technique
- Identification and quantification of BVOC’s emitted from native plants

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**Target Species**

- Melaleuca quinquenervia (broad leaf paperbark)
- Tristaniopsis laurina (river gum)
- Corymbia citriodora (lemon scented iron gum)

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**Research plan**

- Determine the efficiency of the SPME technique
- Obtain emission profiles for target Australian native species
- Investigate the relationship between CO₂ and BVOC emissions from target species
- Investigate the relationship between PAR intensity and target species’ BVOC emissions

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**References**


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