

Metabolome of *Eucalyptus* oil glands; Phytochemical screening of glandular extracts of *Eucalyptus pumila*, *E. gillenii* and *E. parvula*

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Introduction

- The presence of sub-dermal glands rich in volatile terpene essential oils is characteristic of the Genus *Eucalyptus* (Myrtaceae)
- Non-volatile compounds (NVCs), **monoterpene acid glucose esters** (MAGEs) and few phenolics, were reported from glands of some *Eucalyptus* species, however, their ubiquitous nature is unknown
- Objective** - to characterise the NVCs and oil components localised to foliar oil glands of *Eucalyptus pumila*, *E. gillenii* and *E. parvula*

Methodology

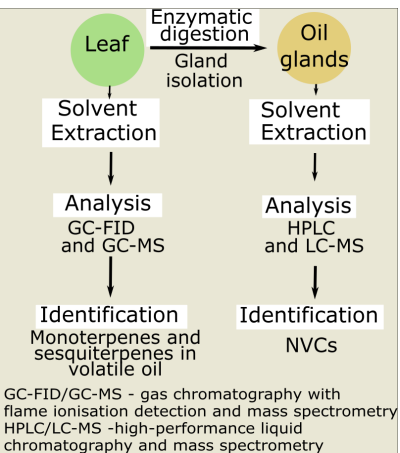


Figure 1: Method followed to identify contents in foliar oil glands of *Eucalyptus* species

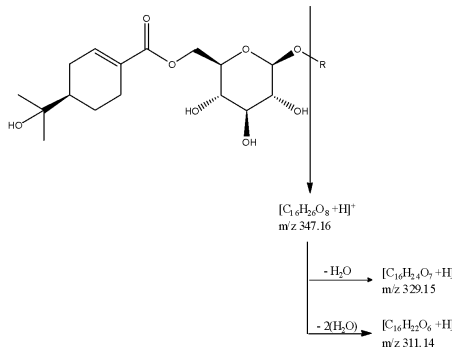


Figure 2: Schematic of the fragmentation of oleuropeic acid glucose esters resulting in the characteristic ion fragments of m/z 311.14 and 329.15

Results

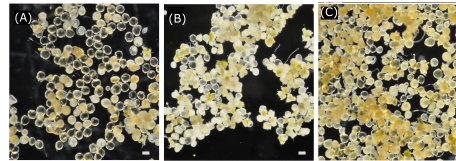


Figure 3: Oil glands isolated from *Eucalyptus* species. (A) *E. pumila* (B) *E. gillenii* (C) *E. parvula*. All scale bars represent 200 μ m

- MAGEs;** cuniloside B, cypellocarpin C and froggattiside A were present in glandular extracts of all three species
- Four novel MAGEs were also present in the extracts of *E. parvula* while *E. pumila* had a single novel MAGE

Conclusions

Foliar glands of *Eucalyptus* species co-house MAGEs and volatile oil components suggesting a possible biosynthetic / physiological relationship between the two groups

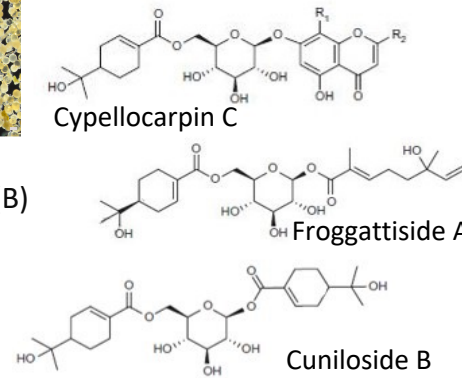


Figure 4: MAGEs identified from *Eucalyptus* foliar oil glands

- Volatile oil;** Leaf extracts from all three species contained monoterpenes and sesquiterpenes. The most abundant oil component was 1,8-cineole (Table 1)

Table 1: Quantification of mono- and sesquiterpenes in *Eucalyptus* leaf extracts. (A) *E. pumila* (B) *E. gillenii* (C) *E. parvula*

	(A)	(B)	(C)
Total oil (mg g ⁻¹ leaf DW)	55.2	21.9	37.9
% of monoterpenes			
1,8-cineole	75.5	58.1	69.2
Limonene	1.5	1.4	2.7
α -pinene	5.0	0.9	3.2
β -pinene	0.1	0.3	0.1
Linalool	0	0	0.4
α -terpineol	0.7	1.1	0.4
p-cymene	1.1	4.5	0.9
% of sesquiterpenes			
β -eudesmol	0.1	0.1	0.2
α -caryophyllene	1.0	0	3.9
Spathulenol	0	9.2	0.2

References

Goodger JQD, Cao B, Jayadi I, Williams SJ, Woodrow IE (2009) Non-volatile components of the essential oil secretory cavities of *Eucalyptus* leaves: Discovery of two glucose monoterpene esters, cuniloside B and froggattiside A. *Phytochemistry* **70**, 1187-1194.

Acknowledgements

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