

Unique bibenzyl cannabinoids in the liverwort *Radula marginata*: parallels with Cannabis chemistry

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Project Description:

Summary

The potential of cannabinoids to address public health challenges has stimulated exploration into alternative sources and production technologies. *Radula marginata*, an endemic Aotearoa/New Zealand liverwort, produces the bibenzyl cannabinoid perrottetinene (PET), analogous to Cannabis psychoactive tetrahydrocannabinol (THC). Structural differences between PET and THC could alter therapeutic interactions and mitigate adverse side effects.

To understand the cannabinoid production potential of *R. marginata*, we analyzed 75 collections from three locations across several seasons, collaborating with kaitiaki Māori (indigenous guardians). Metabolic plasticity of the phytocannabinoids and plant growth was assessed under controlled growth conditions, and in in vitro culture.

Perrottetinene diol (trans-PTD), analogous to cannabidiol (trans-CBD), and its acid precursor (PTDA), were identified and fully characterized from nature for the first time. Bibenzyl-4-geranyl (BB4G), analogous to cannabigerol (CBG), and its corresponding acid (BB4GA), were also isolated. *Radula marginata* showed chemotypes dominated by PET, PTD, or BB4G, in striking analogy to the main Cannabis chemotypes. These site-selective chemotypes persisted after growth under artificial lighting and in in vitro progeny, suggesting genetic control.

These results expand phytocannabinoid knowledge through the discovery of PTD analogous to CBD. They add a new dimension to liverwort cannabinoids and suggest convergent evolution of biosynthesis in two distant plant lineages.

Project Links

- <https://doi.org/10.1111/nph.20349>
- <http://www.wairuakohu.org>



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