Salvia apiana In Vitro Shoot System as a source of unique volatile fraction

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Introduction

White sage (*Salvia apiana* Jepson) is an endemic species typical for the chaparral plant formation of mild, Mediterranean-type climate area of the California Floristic Province in North America. *S. apiana* has been used as a traditional medicinal and ritual plant by the Native North American Chumash people for a long time. Aerial parts of white sage have been used in folk medicine to treat inflammation and as a calmative agent (Krol et al., 2021). The aim of the study was to established and scale-up *S. apiana* microshoot cultures in order to obtain sustainable and stable source of *S. apiana* essential oil (EO).

Plant Materials and Methods

In vitro culture initiation

Seeds sterilization (5.25% NaClO 10 min)

In vitro culture optimization

Growth profile and growth parameters determination

Scaling up microshoots

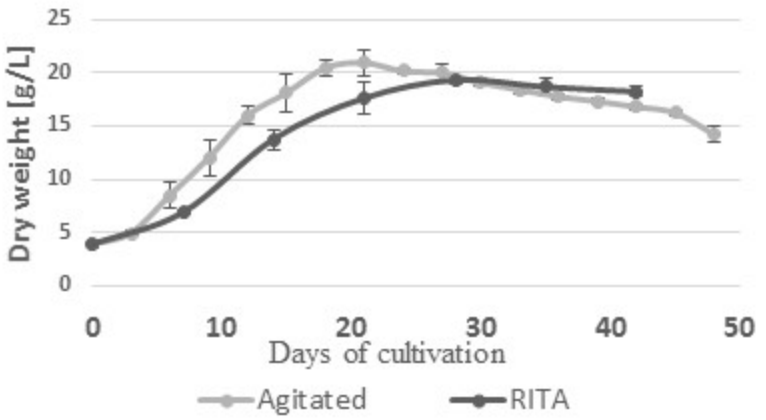
Cultivation in RITA, Plantform and spray glass bioreactor (SGB)

Essential oil isolation and analysis

The isolation of *S. apiana in vitro* biomass essential oil in Clevenger apparatus and GC-FID/MS analysis. Comparative analysis of the *S. apiana* and *S. officinalis* raw material (RM)

Results

Gi(growth index) = 641%
EO content = 1.27%
Schenk-Hildebrandt medium with Thidiazuron 0.22 mg/l and 6-benzylaminopurine (2.0 mg/l)

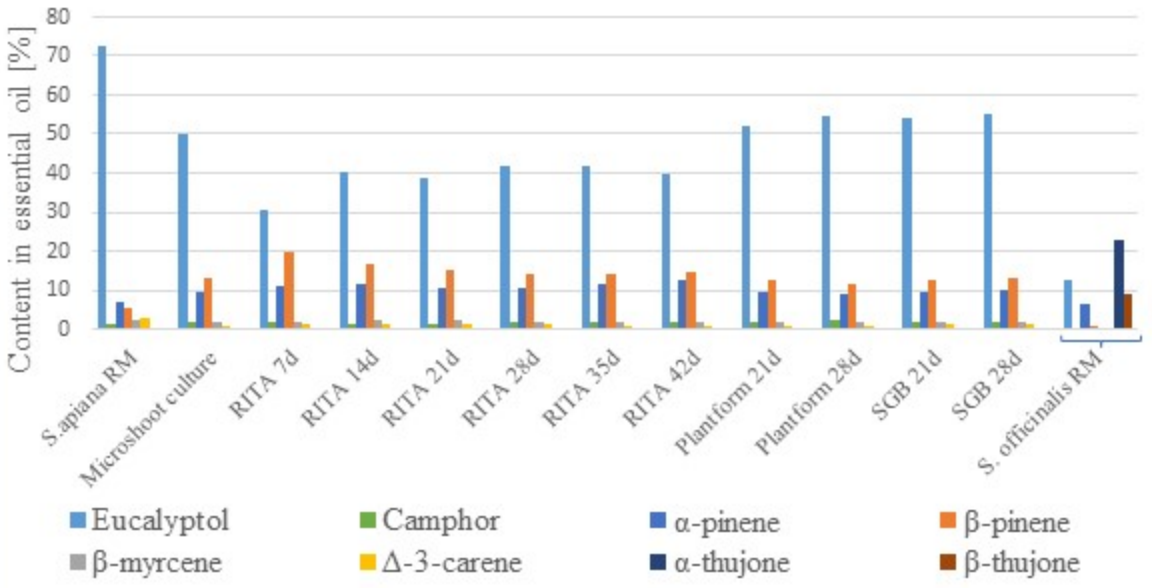


Growth profile of *S. apiana* microshoots, cultivated in RITA® bioreactor, in comparison with the agitated liquid culture

RITA bioreactor
28 days
Gi = 641%
EO content = 1.10%

Plantform bioreactor
28 days
Gi = 521%
EO content = 1.17%

Spray glass bioreactor
28 days
Gi = 576%
EO content = 1.27%



Conclusions

- For the first time, *S. apiana in vitro* shoot cultures were established as the alternative, continuous source of volatile fraction.
- The largest biomass accumulation and essential oil content were achieved with application of prototype spray glass bioreactor for 4 weeks.
- The essential oil was rich in 1,8-cineole, *α*-pinene, *β*-pinene and did not contain thujone.

References

Krol, A., Kokotkiewicz, A., & Luczkiewicz, M. (2021). White Sage (*Salvia apiana*)–a Ritual and Medicinal Plant of the Chaparral: Plant Characteristics in Comparison with Other *Salvia* Species. Planta Medica. doi: 10.1055/a-1453-0964

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