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Volatile compounds released by chocolate mint (*Mentha* × *piperita* var. *chocolate*) leaves after different post-harvest procedures

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1. INTRODUCTION & AIM

Chocolate mint (*Mentha* × *piperita* var. *chocolate*) is a scarcely studied mint variety, so-called for its dark color of the stems and for the particular aroma with chocolate-like nuances [1]. Because the methods employed to extend the shelf-life of plant products can influence their aromatic profile, hot-drying and freeze-drying were compared for their effect on volatile organic compounds (VOCs) emission by dried mint chocolate leaves in comparison to fresh leaves.

Figure 1. *Mentha* × *piperita* var. *chocolate* plant

2. METHOD

Apical leaves were harvested from four month old chocolate mint plants. Some were analyzed immediately, other were hot-dried at 42 °C for 16 hours or freeze-dried for 22 hours after freezing at -22 °C. The VOCs emitted by the three samples were analyzed by solid phase microextraction (SPME) followed by gas-chromatography coupled to mass spectrometry (GC/MS) [2].

4. CONCLUSION

Several components were retained over the two post-harvest drying procedures evaluated, however the two treatments had an impact on mint's complex aromatic profile. This is especially true for chemicals in the menthol pathway, which results in unique / distinct flavors with a drop in D-limonene and menthol and an increase in menthone and menthol after drying.

5. FUTURE WORK / REFERENCES

To better understand the menthol synthesis process at the post-harvest stage and, subsequently, to manage alternative treatments to achieve appropriate or new aromatic characteristics, we will test different drying temperatures and / or various dehydration times.

[1]https://doi.org/10.1016/j.lwt.2017.05.064;
[2] https://doi.org/10.3390/horticulturae9050598;
[3] https://doi.org/10.1007/s00114-005-0055-0;
[4] https://doi.org/10.3389/fpls.2022.928178

3. RESULTS & DISCUSSION

A total of 17 VOCs were detected for the three samples (Figure 2). In general, both drying methods slightly influenced the aromatic profile of fresh mint, even though most compounds were preserved.

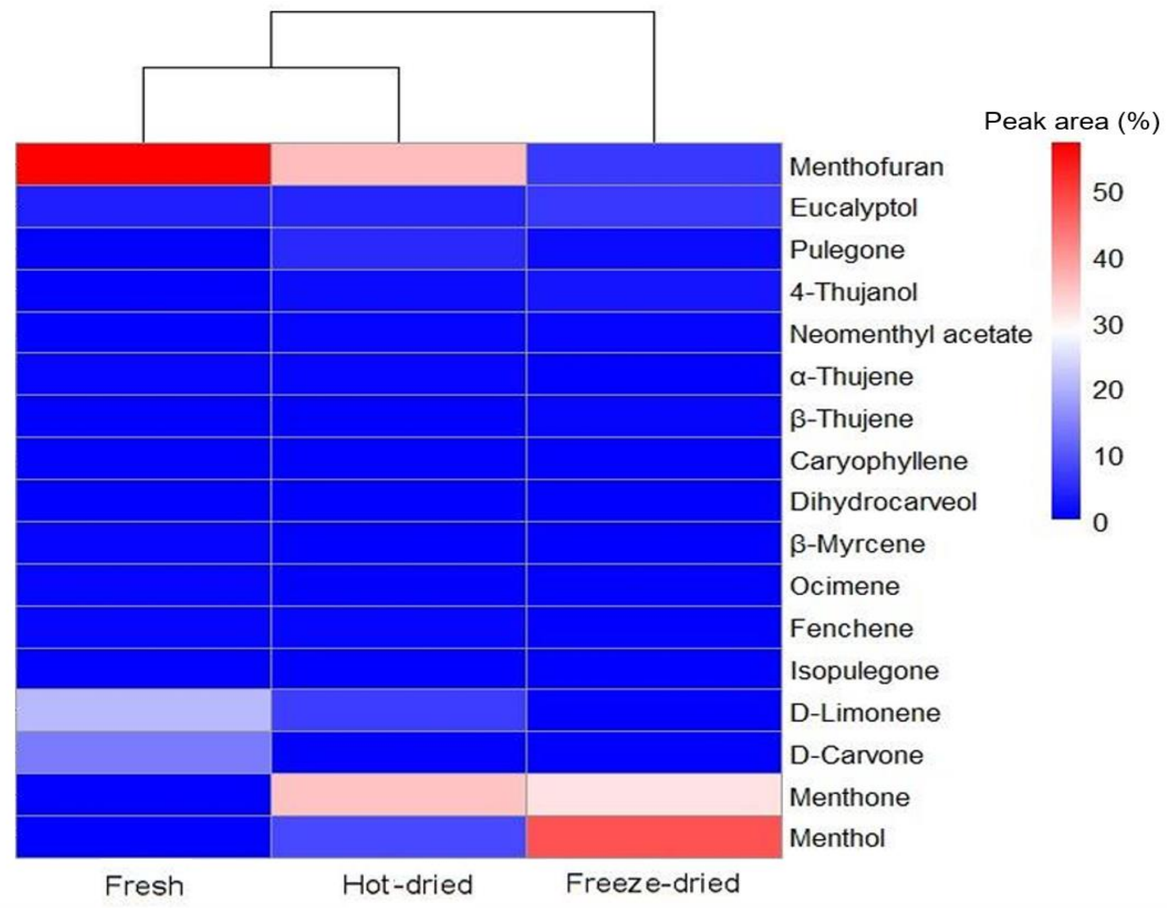

Figure 2. Heatmap displaying the intensity of VOCs emitted by fresh mint, hot-air dried mint and freeze- dried mint. The different colors represent the peak area percentage.

Part of the menthol biosynthetic route is reported in figure 4. Menthol is synthesized in the cytosol, while menthofuran is produced in the endoplasmic reticulum [3,4]. The Figure 3 shows the main compounds of the menthol pathway in response to drying treatments. The thermal shock induced by the drying processes seems to enhance the menthol synthesis (Figure 4).

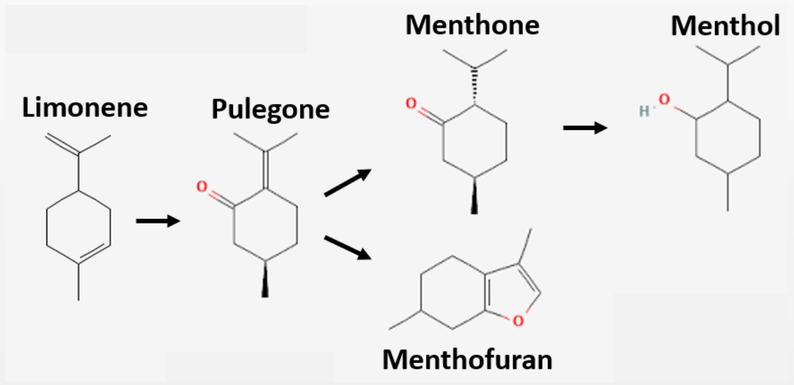

Figure 3. Simplified menthol and menthofuran biosinthetic pathway.

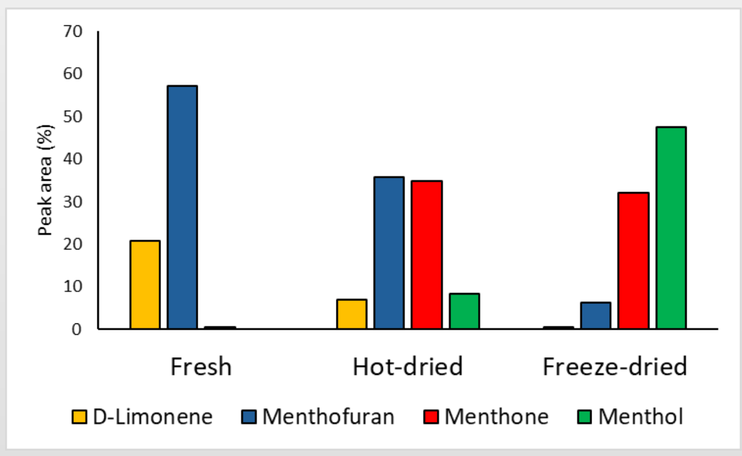

Figure 4. Peak area (%) of the main compounds in response to different treatments.