ELUCIDATION OF THE VOLATILOME OF PACKAGED SPANISH-STYLE GREEN OLIVES OF *CONSERVOLEA* AND *HALKIDIKI* VARIETIES USING SPME-GC/MS

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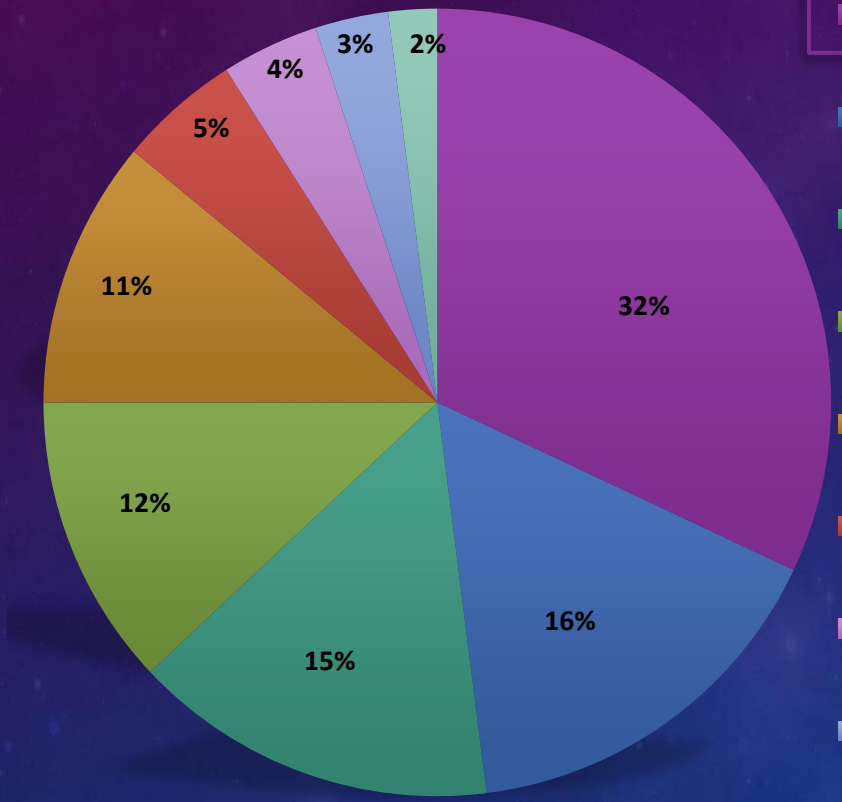
WORLD TABLE OLIVE PRODUCTION



(IOOC, 2018)

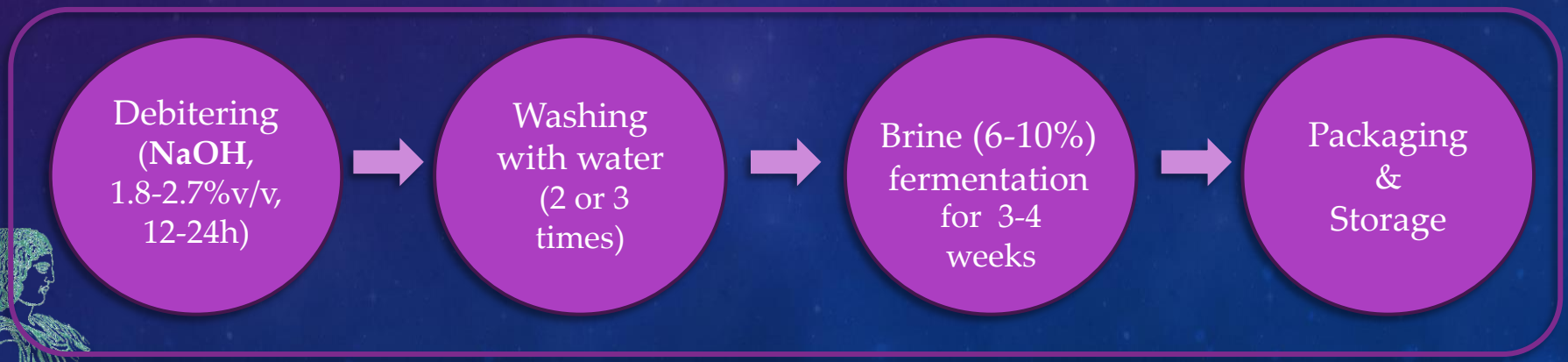
- European Union
- Egypt
- Turkey
- Algeria
- Other countries
- Maroco
- Syria
- Iran
- Peru

- Spain
- Greece
- Italy
- Portugal

TRADE PREPARATIONS

(Trade Standards Applying to Table Olives, COI/OT/NC no. 1, December 2004)

- **Greek-style** → Natural olives in brine
- **Californian style** → Olives darkened by oxidation
- **Spanish-style** → Treated olives in brine



TRADITIONAL GREEK VARIETIES USING THE SPANISH-STYLE FERMENTATION

cv. **Conservolea**

cv. **Halkidiki**

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VOLATILES RELATED TO THE PRODUCT'S FLAVOR

- Table olives → Fermented product → Characterized by variety of VOLATILE COMPOUNDS

↓

Mainly products of

MICROBIAL METABOLISM

FLAVOR + **AROMA** → Related to QUALITATIVE + QUANTITATIVE composition of **VOLATILOME**

↓

QUALITY **SHELF LIFE**

↓

ACCEPTANCE BY CONSUMER

PURPOSE OF THE STUDY

Monitoring and characterization of the **volatile profiles** of Conservolea and Halkidiki cultivars processed by the Spanish method and packaged in multi-laminated pouches under modified atmospheres for a period of 12 months

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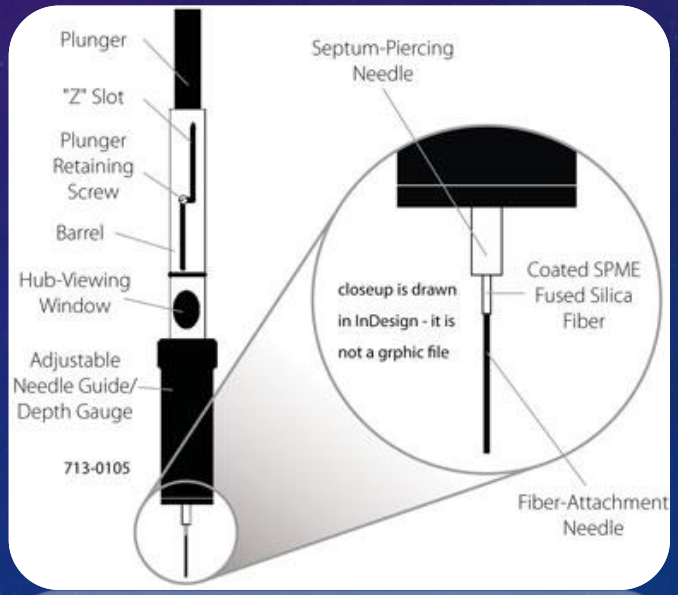
MATERIALS AND METHODS

- Olive samples were processed using the Spanish method and afterwards they were packaged in multi-laminated pouches, under modified atmosphere (70% N_2 and 30% CO_2). The pouches were stored at room temperature for a period of 12 months.

- They were analyzed every month for the determination of their volatile profile using

↓

SPME GAS CHROMATOGRAPHY - MASS SPECTROMETRY (GC – MS)



https://www.sigmaaldrich.com/technical-documents/articles/reporter-us/bioanalysis-with-spme.html

GC-MS ANALYSIS RESULTS

88 Compounds identified

- Aldehydes
- Ketones
- Terpenes
- **Acids**
- **Esters**
- **Alcohols**

HIGH CONTENTS
In both cultivars

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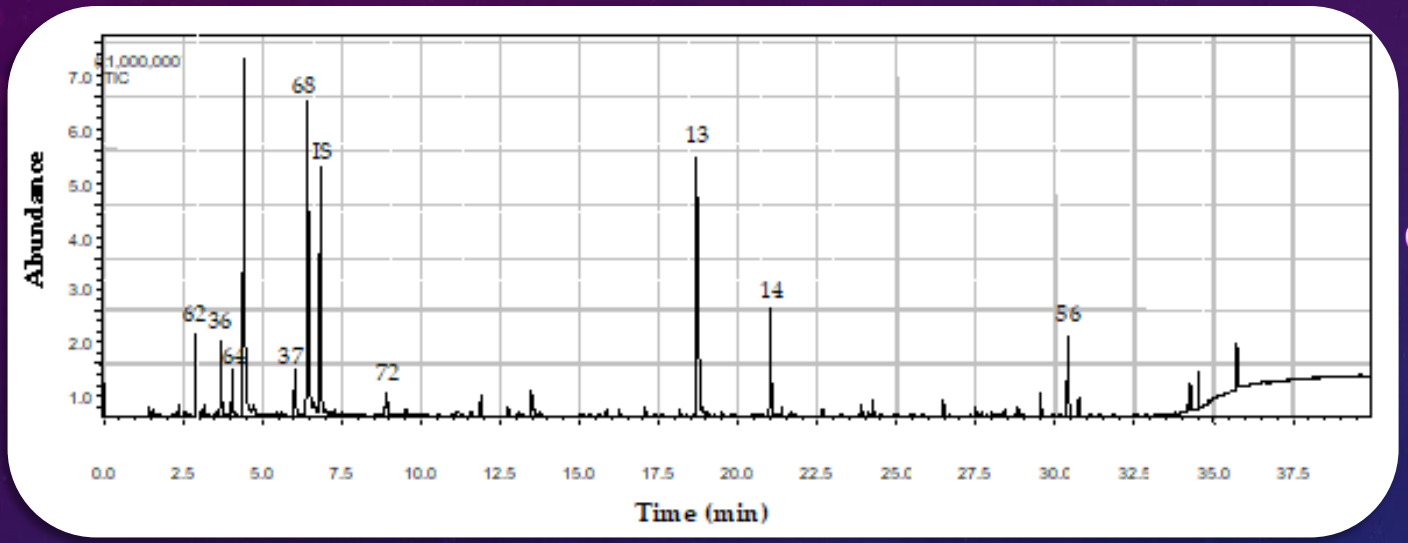
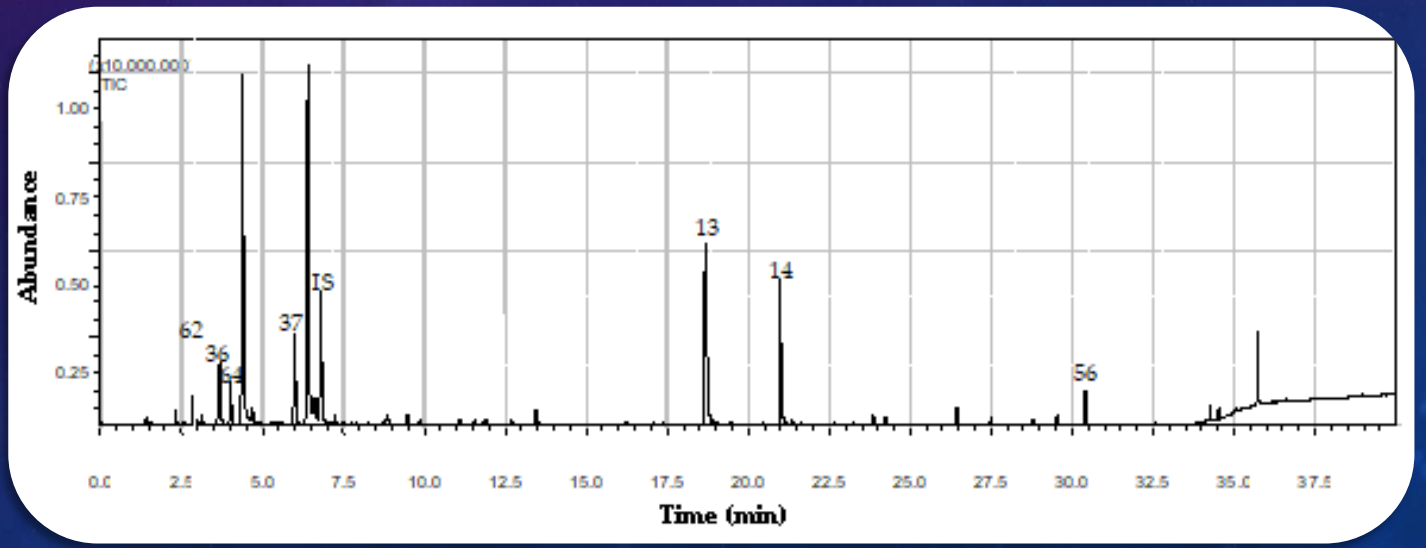
TOTAL ION CHROMATOGRAMS



cv. Conservolea

cv. Halkidiki



DIFFERENCES BETWEEN CULTIVARS

QUALITATIVE
Composition

→ no significant differences between cv. Conservolea and cv. Halkidiki

→ **MOST DOMINANT COMPOUNDS IN BOTH CULTIVARS**

- **Acetic acid**
- **Propanoic acid**
- **Ethanol**
- **2-butanol**
- **1-propanol**
- **Thymol**
- **Ethyl acetate**
- **Ethyl propanoate**
- **Propyl acetate**
- **Propyl propanoate**

QUANTITATIVE
Composition

- **2-butanol** → cv. Halkidiki >> cv. Conservolea
- **Ethyl propanoate**
- **p - methylguaiacol** → cv. Conservolea >> cv. Halkidiki

EVOLUTION OF VOLATILES OVER TIME

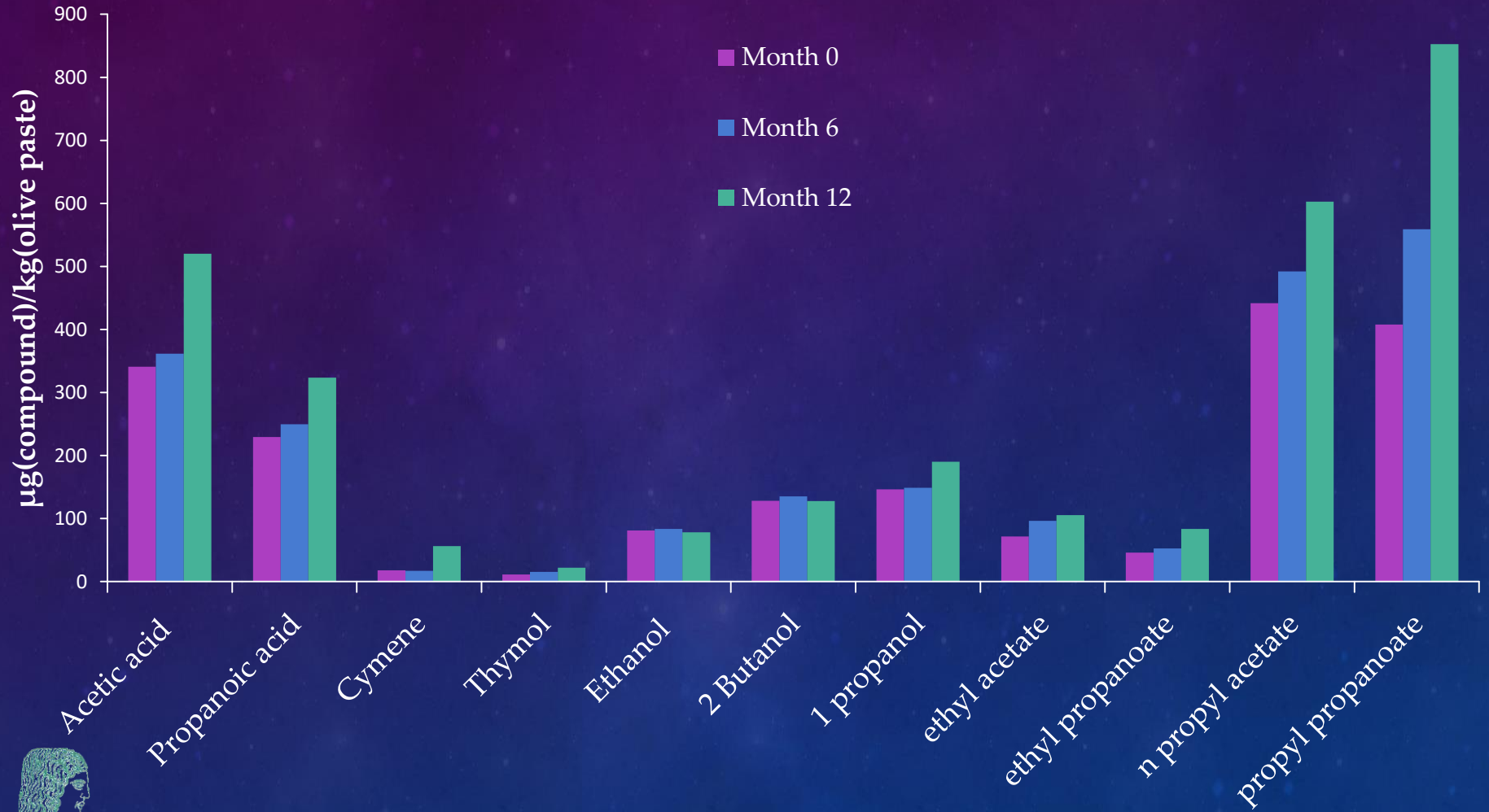


Figure 1. Evolution of the most important volatile compounds over storage time of cv. **Halkidiki**

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EVOLUTION OF VOLATILES OVER TIME

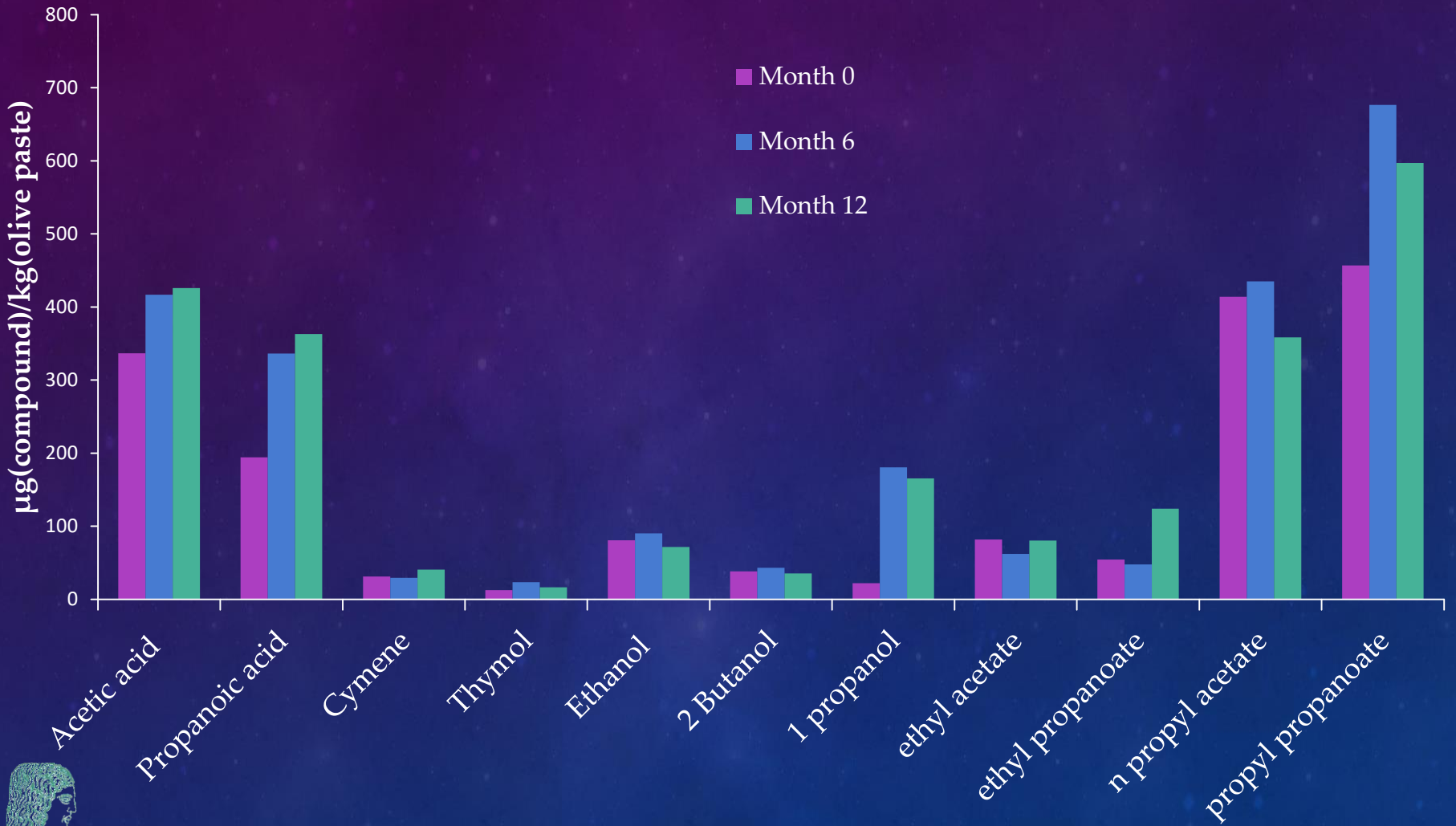

Figure 2. Evolution of the most important volatile compounds over storage time of cv. **Conservolea**

EVOLUTION OF VOLATILES OVER TIME

- Mild increase in the contents of **propanoic acid**, **ethyl propanoate**, **ethyl acetate**, **acetic acid**, **cymene** and **thymol**, in both table olive varieties

- **Ethanol**, **2-butanol** and **1-propanol** presented a small increase until the sixth month and a reduction thereafter in all tested samples

- In cv. **Halkidiki**, there was a considerable increase over time of **propyl acetate** and **propyl propanoate**

- In cv. **Conservolea**, **propyl acetate** and **propyl propanoate** were significantly decreased during the last six months of storage

CONCLUSION

- The volatile profiles of Spanish-style green olives of cvs. Conservolea and Halkidiki in multi-laminated pouches, under modified atmosphere during 12 months of storage at ambient temperature, included 88 identified compounds
- High contents of acetic and propanoic acids, as well as propyl acetate and propyl propanoate along with ethanol were detected in all samples
- No significant qualitative differences were observed among the two varieties regarding their volatilomes
- The volatile compounds detected in this study suggests that all samples underwent both alcoholic and lactic fermentation, which explains the high contents of acetic acid and ethanol
- The presence of bacteria such as *Acetobacter* spp. yeasts and *Propionibacterium* spp. can be confirmed by the high amounts of propanoate and acetate esters, acetic and propanoic acids, compounds produced by such bacteria through their metabolism

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THANK YOU FOR YOUR ATTENTION !!

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