



AROMA CHARACTERIZATION OF VIRGIN OLIVE OIL FROM FIVE TURKISH OLIVE VARIETIES BY SPME/GC/QTOF MS



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INTRODUCTION

Extra-virgin olive has a unique flavor that distinguishes it from other vegetable oils (Boskou, 1996:12). Sensory quality is affected by different volatile and phenolic compounds of olives (Mansouri ve ark., 2018). The formation of these components varies depending on many factors such as the climatization, variety, sea level where olives are grown, growing techniques, harvesting time, processing techniques and storage conditions (Bayrak ve ark., 2010; García-Vico ve ark., 2017).

In this study, the changes in the volatile compounds of olive oil were investigated in terms of variety and geographical regions. The volatile compounds of olive oils were extracted by solid phase micro extraction (SPME) method and identified by gas chromatography-time-of-flight mass spectrometer (GC QTOF-MS).

MATERIAL AND METHODS

Olive samples were taken from 4 different regions (Mediterranean, Aegean, Southeastern Anatolia, Marmara) in 2019-2020. A total of 100 olive oil samples were obtained under the same conditions by cold pressing during two harvest years.

5 ml of olive oil sample was placed in a 40 mL SPME vial sealed with a polytetrafluoroethylene-faced silicone septum. The vial was left at 45°C in a thermoblock during 60 min with magnetic stirring. The DVB/CAR/PDMS fiber (50/30 µm, Supelco) which was absorbed by the volatile compounds was thermally desorbed into the injection port of the gas chromatography for 10 min at 250°C. Identification of volatile compounds were carried out using databases developed by NIST and WILEY.

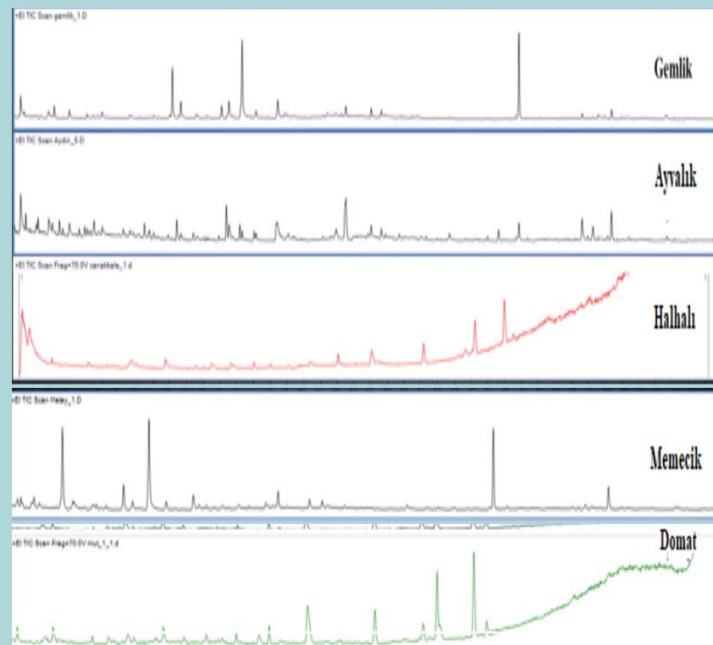


Figure 1. Sample volatile component chromatograms of olive oils obtained from different regions

Table 1. The amount of volatile compounds in olive samples taken from different regions (%area)

Volatiles (% area)	RT	GEMLİK	AYVALIK	MEMECİK	DOMAT	HALHALI
Decenal	5,2	22,46	26,2	3,65	3,84	18,5
Phenyl ethyl alcohol	5,3	0,89	3,72	8,23	1,27	4,2
Dihydro carvone<trans->	6,1	5,19	3,81	0,52	0,3	1
Nerolidyl acetate<E->	6,9	8,07	10,9	1,87	ND	9,2
Pentanol<3-methyl->	7,7	7,62	3,42	10,3	3,28	2,4
6 Methyl-5 Hepten-2 One	8	17,76	14,75	ND	ND	ND
Farnesene<Beta>	8,2	12,21	7,23	ND	7,1	ND
Copaene<Beta>	9	ND	1,1	2,8	ND	0,9
Ocimene<Z>-beta->	9,2	0,81	2,3	3,1	9,99	ND
Benzaldehyde	9,7	ND	ND	2,29	ND	0,7
Hexanoic acid	13,3	0,73	ND	4,73	2,12	ND
Guaiadiene	14,1	0,75	ND	3,07	1,06	0,4
Phenyl ethyl alcohol	16,5	0,89	ND	8,23	1,27	4,1
Trans 2 Hexenal	18,9	12,3	17,4	25,4	28,6	12,8
cis 3 Hexanol	21,3	2,18	3,47	2,84	ND	1,27
Dimethyl-6hept-2 Ene<Bergamotene>	22,5	1,11	2,8	2,84	2,14	0,9
Copaene	24,2	0,75	0,8	2,84	1,25	0,9
Heptanal	26,8	0,7	0,25	2,84	0,9	0,5
Hexalactone<Gamma->	27,4	ND	ND	2,84	1,08	4,4
Benzene Acetaldehyde	28,5	ND	ND	2,84	ND	13,9
Dihydro Carveol<Neo->	30,4	3,19	2,3	2,84	14,87	4,8
Phenyl Ethyl Formate<2->	33,1	ND	ND	2,84	ND	10,8
Guaiacol<Ortho->	35,8	0,84	ND	2,84	0,81	5,5
Ethyl Benzoate	42,4	1,6	ND	2,84	ND	2,8
Pinene<Alpha->	44,2	ND	ND	2,84	7,09	ND
Carene<Delta-3->	45	ND	ND	2,84	12,04	ND
Cymenene<Para->	45,3	ND	ND	2,84	1,05	ND

N.D. Not detected

CONCLUSION

The analysis of volatile compounds of olive oil samples obtained from olive varieties in different geographical regions indicates that trans-2-hexenal has high scores in all regions. In addition, Decenal, phenyl ethyl alcohol, dihydrocarvon (trans) were detected at different rates amongst regions.

It is seen that 6 methyl 5 hepten-2 one for gemlik and ayvalik varieties in the Marmara region, Carene delta3 and Pinene alpha for domat and memecik varieties in the Aegean region, benzene acetaldehyde for the halkali variety grown in the Mediterranean region.

However, when the effect of seasonal changes are considered, these results need to be confirmed by analysis of olive oil samples which will be collected from different production years.



GC QTOF-MS

References

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