

Aromatic profile of grape and fruit brandies determined by GC equipped with flame ionization detector

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INTRODUCTION

The cultivation of grapes and fruits has a long tradition in Macedonia, and this also imposes the production of grape and fruit brandies. In recent years, the tradition has been moving to small local distilleries, and this has also entailed the development of related stories for the creation of unique drinks in limited quantities.

The aim of this research was to determine the main aromatic compounds in domestic grape and fruit brandies, distilled under traditional conditions and to try to find the main factors that distinguish the samples according to their origin. Additionally, samples of Mastika and Gin were included in the study.

Analysis of the aromatic compounds was performed using the GC-FID technique.

MATERIALS AND METHODS

➤ **67 brandies analyzed: 52 grapes brandies** (Vranec, Temjanika, Muskat Hamburg, Rkachitel, Smederevka, Afus Ali, Plovdina, Prokupec, Traminets, Riesling and Pinot Noir) and **15 fruit brandies** (plum, apricot, peach, Red Delicious apple, Dzhanka plum and Ohrid cherry)

Production: All grape brandy samples were produced under domestic and traditional distillation conditions.

GC-FID instrument: HP 6890 N gas chromatograph (Agilent Technologies, Palo Alto, CA, USA).

Column: ZB WAX (30 m x 320 µm x 1 µm)

Temperature program: 40 °C 1 min., ramp 4 °C/min., final temperature 184 °C, total time 37 min.

RESULTS AND DISCUSSION

Table. 1. Aroma compounds in fruit brandies

Samples	Acetaldehyde (mg/L)	Ethyl acetate (mg/L)	Methanol (mg/L)	1-Propanol (mg/L)	1-Butanol (mg/L)	2-Methyl- 1 butane (mg/L)	Isoamyl acetate (mg/L)	Hexanol (mg/L)	2-Phenylethanol (mg/L)
Plum Dzanka	48.46	571	4424	484	191	1334	310	43.15	19.54
Plum	55.69	450	3993	479	7.20	687	147	n.d.	11.32
Apricot 1	154	620	3341	1542	17.12	522	30.65	5.8	5.04
Apricot 2	157	909	2285	501	59.35	1075	82.95	25.25	11.33
Peach	62.48	1969	3724	1091	12.48	901	n.d.	55.28	6.75
Ohrid cherry	70.36	424	1275	413	5.04	243	353	n.d.	n.d.
Apille	126	1483	2128	713	39.30	923	16.49	27.70	12.39
R.Delicious									
Gin with raspberry	57.24	117	565	199	n.d.	1042	n.d.	8.38	n.d.
Mastika	93.16	116	181	103	n.d.	1082	61.09	4.00	13.89

🍷 The aromatic profile of sprits was mostly formed by **esters** (ethyl acetate, Isoamyl acetate) and **higher alcohols** (2-methyl-1-butanol and 1-propanol). The most desirable aroma in fruit brandies was 2-phenylethanol (aromas of rose, honey).

🍷 **Grapes samples contained high concentration of esters and higher alcohols that contribute to a complex aromatic profile.**

Table. 2. Aroma compounds in grape brandies

Sample	Acetaldehyde (mg/L)	Ethyl acetate (mg/L)	Methanol (mg/L)	1-Propanol (mg/L)	1-Butanol (mg/L)	2-Methyl- 1 butane (mg/L)	Isoamyl acetate (mg/L)	Hexanol (mg/L)	2-Phenylethanol (mg/L)
Muskat Hamburg 1	35.20	341	530	775	5.74	2173	25.64	15.20	33.07
Muskat Hamburg 2	22.84	342	924	640	6.61	1481	71.64	16.49	21.91
Muskat Hamburg 3	45.81	414	773	521	5.74	1426	58.47	13.08	24.14
Muskat Hamburg 5	82.02	623	1176	186	n.d.	1366	19.04	18.30	5.99
Temjanika 1	94.57	326	1209	318	9.06	2826	n.d.	14.07	14.01
Temjanika 2	2747	596	469	176	n.d.	1013	58.48	6.24	24.03
Smederevka 1	14.79	296	550	218	n.d.	1704	141	6.48	40.47
Smederevka 2	99.87	457	606	94.13	n.d.	1088	22.55	21.22	31.42
R'kaciteli	58.95	512	1117	124	6.41	2027	16.77	14.85	50.80
Vranec 1	55.75	419	630	225	n.d.	1461	n.d.	6.35	59.74
Vranec 2	243	367	717	156	6.14	1422	48.55	5.02	34.83
Kratošija	102	893	616	295	5.58	1435	48.63	7.52	37.40
Mixture of grapes 1	144	1065	738	252	11.66	1128	48.47	7.45	40.93
Mixture of grapes 2	54.44	621	557	209	n.d.	2206	51.93	7.00	33.98
Mixture of grapes 3	212	1753	809	163	7.75	1406	18.89	4.36	38.46
Mixture of grapes 4	185	1144	3503	443	31.29	783	296	11.82	23.98
Afus Ali	50.49	321	687	194	6.06	929	121	n.d.	45.10
Burgundec 1	93.48	521	620	114	n.d.	1327	27.10	13.44	65.99
Bugundec 2	89.65	632,00	602,88	109	n.d.	1352	27.72	13.61	65.68
Plovdina	233	520,14	520,63	185	n.d.	1128	n.d.	14.70	17.34

According to eur-lex/regulation 2019/787 all samples are below the maximum permitted concentrations

CONCLUSION

- ✓ Among the esters, ethyl acetate was dominant in peach brandy.
- ✓ As for alcohols, 2-methyl-1-butanol was most abundant in the aromatic grape brandy Temjanika.
- ✓ Methanol was also detected in the samples within limits below the maximum allowed in European Union (2 000 mg/L), except in one sample. This indicates that the domestic brandies were safe for consumption in moderate quantities.

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