

Cluster thinning improves aroma complexity of white Maraština (*Vitis vinifera* L.) wines compared to defoliation under Mediterranean climate

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Supplementary Table S1 Odour description and odour threshold (ODT) of 73 aroma compounds detected in 'Maraština' wines

Aroma compound	Odour description	ODT* (µg L ⁻¹)	Reference
α -Pinene	Camphor, citrus, fruity, green, pine, sweet, wood	10	1
<i>cis</i> -Linalool oxide, furan	Leaf, sweet, floral, creamy	6000	2, 3
Linalool	Floral, fruity, orange	15	4, 5
Terpinen-4-ol	Floral, Herbaceous	100	6
Hotrienol	Fresh, floral, fruity	110	7
α -Terpineol	Lilac, floral, sweet	250	8
Citronellol	Rose	40	5
Nerol	Rose, fruity, floral	300	5
Geraniol	Citrus, citric fruit	30	4, 9
Geranyl acetate	Flowery	9	10
TDN	Petrol, kerosene	2	11
β -Damascenone	Sweet, fruity, floral, honey	0,05	9, 12
Isobutyl acetate	Solvent	1600	13
Ethyl butanoate	Pineapple, apple, peach	20	4, 5
Ethyl-2-methylbutanoate	Apple, strawberry	1	4
Ethyl-3-methylbutanoate	Fruity, pineapple	3	4, 14
Isoamyl acetate	Banana	30	9
Ethyl hexanoate	Fruity , banana, anise	5	4
Hexyl acetate	Fruity, green, sweet	1500	5, 15
Ethyl lactate	Strawberry, raspberry	154700	16
Ethyl-2-hydroxy-3-methylbutanoate	Pineapple, strawberry, honey	21000	17
Ethyl octanoate	Pineapple, pear, floral	2	4
Methyl-2-furoate	Fruity, fungal, tobacco, sweet		18
Ethyl furoate	Plum, raisin	16000	8
Ethyl decanoate	Floral, grape, fruity, solvent	200	8, 14
Diethyl succinate	Overripe, aged	200000	5
Methyl geranoate	Floral	9	10
2-Phenylethyl acetate	Rose, honey, tobacco	250	9, 14
Ethyl hexadecanoate	Sweet, waxy	2000	19
Isobutanol	Alcohol, nail polish, green	40000	5, 13
1-Butanol	Medicinal, phenolic, alcohol	150000	16

2-Methyl-1-butanol	Winey, nail polish	30000	3, 4
Isoamyl alcohol	Fruity, winey, alcohol, nail polish, cheese	30000	4, 12
1-Pentanol	Bitter, almond, balsamic	64000	5, 13
3-Methyl-1-pentanol	Pungent, cognac, winey, green, fruity	1000	20
1-Hexanol	Green, grass	8000	4, 8, 13
<i>trans</i> -3-Hexene-1-ol	Green grass, resinous, cream	1000	20
1-Octen-3-ol	Mushroom, green	1	21
1-Heptanol	Floral, herbal, nutty	3	21
1-Octanol	Intense citrus, jasmine, rose	120	22
1-Nonanol	Rose, citrus, fatty	50	23
1-Decanol	Orange flowery, special fatty	400	5, 8
Phenylethyl Alcohol	Floral, rose, pollen, perfumed	14000	5, 8
2,3-Butanediol	Fruity	150000	5
Furfuryl alcohol	Sweet, caramel, nutty	2000	18
Benzyl alcohol	Caramel, fruity, floral	200000	5, 13
2-Octenal	Herbal, nutty	3	23
Furfural	Sweet, wood, almond	14100	5, 8, 13, 18
Decanal	Soap, orange	2	21
Benzaldehyde	Almond, caramel, fruity	350	5
Benzeneacetaldehyde	Rose, flower	1	15
Neral	Fruity, lemon	30	1
Propanoic acid	Rancid, oily, vinegarish	8100	22, 24
2-Methylpropionic acid	Rancid, cheesy	220	8, 13
Butanoic acid	Sour, rancid, cheese	173	8
Isovaleric acid	Sweet, acid, rancid	33	8, 13
Hexanoic acid	Sweet, cheese, oily	420	8
Heptanoic acid	Rancid, cheesy	3000	24, 25
Nonanoic acid	Waxy, dirty, cheesy	3000	23
Decanoic acid	Rancid, waxy	1000	5, 8, 14
Eugenol	Spicy, Cinnamon, clove, honey	5	4
4-Ethylphenol	Phenol, stable	440	12
4-Vinylguaiaicol	Spicy, Clove, curry	40	4, 5
Vanillin	Vanilla	60	15
γ -Butyrolactone	Coconut, caramel	1000	3
γ -Hexalactone	Sweet, cake, peach	1600	26
γ -Octalactone	Sweet, creamy, coconut	7	27
γ -Nonalactone	Coconut, peach, sweet, fatty	25	27
γ -Decalactone	Caramel, fatty, peach, dried fruits	0.7	27
δ -Decalactone	Creamy, coconut, peach	100	27
γ -Undecalactone	Apricot, coconut, spice	60	27
6-Methyl-5-hepten-2-one	Citrus, green, lemongrass, apple	50	28
Acetoin	Buttery, creamy, flowery, wet	150000	12

^aThe odour threshold is given in the reference 1 in sweet water; in the reference 2 odour perception threshold has been calculated in a grape juice; in the 3, 9, 12 the matrix was a water/ethanol (90 + 10, w/w); in the reference 4, 5, 8, 10, 18, 21-23, 25, 27 and 28 value is given in water; in the reference 7 matrix was synthetic wine (11% v/v ethanol solution containing 7 g L⁻¹ glycerol, 5 g L⁻¹ tartaric acid, with the pH adjusted to 3.4 with 1M NaOH); in reference 11, 14, 17 matrix was wine; in the reference 13 and 15 the matrix was 10% water/ethanol solution at pH 3.2; in the reference 16 matrix was 10% v/v ethanol solution adjusted to pH 3.5 with tartaric acid; in the reference 19 matrix was 8.91 g/100 g water/ethanol solution containing 7 g L⁻¹ glycerol and 5 g L⁻¹ tartaric acid, with the pH adjusted to 3.4 with 1 mol/L NaOH; in the ref 20 matrix was 14% v/v ethanol solution adjusted to pH 3.5 with tartaric acid; in the ref 24 the matrix was 10% water/ethanol mixture containing 5 g L⁻¹ of tartaric; in the reference 26 the matrix was 10% water/ethanol mixture containing 5 g L⁻¹ of tartaric acid at pH 3.

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Supplementary Table S2 Odor activity values (OVA) for volatile compounds in the wine of 'Maraština' from five different canopy management treatments pre-flowering (PF), after berry set (BS), and veraison (V) defoliation, cluster thinning without defoliation, 35% clusters thinned in veraison (CT) and untreated control (C)

Aroma compound	Odour classes*	Odour description	ODT ($\mu\text{g L}^{-1}$)	OAV_PF	OAV_BS	OAV_V	OAV_CT	OAV_C
Linalool	Floral	Floral, fruity, orange	15 ^{4,5}	1.00	0.82	0.82	1.36	1.02
β -Damascenone	Fruity, Pome	Sweet, fruity, floral, honey	0,05 ^{9,12}	72.20	47.60	48.60	62.00	69.20
Ethyl butanoate	Fruity, Tropical	Pineapple, apple, peach	20 ^{4,5}	8.30	7.29	10.51	11.09	9.40
Ethyl-2-methylbutanoate	Fruity, Pome	Apple, strawberry	1 ⁴	4.48	3.39	2.09	4.51	4.43
Ethyl-3-methylbutanoate	Fruity, Tropical	Fruity, pineapple	3 ^{4,14}	3.18	2.59	2.04	4.02	4.05
Isoamyl acetate	Fruity, Pome	Banana	30 ⁹	31.86	21.70	45.79	46.79	34.38
Ethyl hexanoate	Fruity, Pome	Fruity, banana, anise	5 ⁴	51.69	64.50	88.05	72.99	70.21
Ethyl octanoate	Fruity, Pome	Pineapple, pear, floral	2 ⁴	258.47	181.04	273.61	222.14	219.13
1-Octen-3-ol	Vegetable, Green	Mushroom, green	1 ²¹	1.56	1.37	2.56	2.78	2.25
1-Heptanol	Vegetable, Mushroom	Floral, herbal, nutty	3 ²¹	3.87	2.99	1.62	2.11	3.90
2-Octenal	Vegetable, Green	Herbal, nutty	3 ²³	91.51	73.07	105.08	93.43	87.80
Benzeneacetaldehyde (2-phenylacetaldehyde)	Floral	Rose, flower	1 ¹⁵	7.42	8.55	6.21	5.77	8.48
Hexanoic acid	Mineral, Fatty	Sweet, cheese, oily	420 ⁸	2.65	3.13	3.56	3.47	3.11
4-Vinylguaiaicol	Sweet spices	Spicy, clove, curry	40 ^{4,5}	0.76	0.81	0.88	1.25	1.27
γ -Decalactone	Fruity, Stone, fat	Caramel, fatty, peach, dried fruits	0.7 ²⁷	2.20	2.27	2.56	3.20	2.70
6-Methyl-5-hepten-2-one	Fruity, citrus	Citrus, green, lemongrass, apple	50 ²⁸	2.28	1.80	1.25	2.27	2.35

*Sixteen compounds are classified in odour classes according their distribution in Flavornet database: floral, fruity: pome, tropical, stone or citrus, vegetable: green or mushroom, mineral, fatty, sweet or spicy aroma (Flavornet, <http://www.flavornet.org/flavornet.html>, accessed on 28 February 2022)