

**Table 2. Aroma compounds in the grape berry.** Fontes N, Gerós H, Delrot S. 2011. Grape berry vacuole: a complex and heterogeneous membrane system specialized in the accumulation of solutes. *Am J Enol Vitic* 62: 270-278

Group	Common compounds	Odour description	Aromatic precursor (odourless)	Location		Observations	References
				Skin	Flesh		
Terpenoids (Monoterpenes; Sesquiterpenes)	Monoterpenols: Linalol Geraniol Nerol	<i>rose</i> <i>rose</i> <i>rose</i>	Glycoside conjugates	+++	+	Mostly present in Muscat varieties as both free (volatile) and bound (non-volatile) forms; Nerol and geraniol concentrate in the skin; Both free and bound fractions tend to decline at maturity; Synthesised at ER and accumulated in the vacuoles	Gunata et al. 1985 Park et al. 1991
Norisoprenoids (C <sub>13</sub> norisoprenoids)	β-damascenone β-ionone TDN Vitispirane	<i>honey</i> <i>violet</i> <i>kerosene</i> <i>spicy, woody</i>	Glycoside conjugates	+	+++	Mostly accumulated as bound non-volatile compounds; only trace amounts of damascenone occurring as free volatile molecules; Products of carotenoid degradation; Levels increase after <i>véraison</i> ; Accumulation in the berry not closely related to sugar concentration;	Lewinsohn et al. 2005 Razungles et al. 1993
Organo-sulfur compounds (Thiols)	3-sulfanylhexasan-1-ol; 2-methylfuran-3-thiol; 4-methyl-4-sulphanylpentan-2-one; 3-sulfanylbutan-1-ol; 3-sulfanylpentan-1-ol;	<i>Sulphur, passion fruit, cat urine, box tree, rhubarb;</i> <i>meaty</i> <i>box tree</i>	S-cysteine conjugates	+	+	S-cystein conjugates largely restricted to the skin; Suffer further cleavage in the vacuole resulting in a specific cystein conjugate; Precursors appear differently during maturation	Tominaga et al. 1998 Mestres et al. 2000 Francis and Newton 2005
Methoxypyrazynes (Pyrazynes)	IPMP IBMP SBMP	<i>onion, leek grapefruit asparagus, green pea</i> <i>green pepper</i> <i>beet, earthy</i>		+	-	Positive and negative contribution to wine aroma, flavour and mouthfeel; Vegetative character of Cabernet Sauvignon variety; Accumulation peak prior to <i>véraison</i> and further drop as the berry ripens	Belancic and Agosin 2007 Parr et al. 2007

TDN – 1,1,6-trimethyl-1,2-dihydronaphthalene; TPB – (E)-1-(2,3,6-trimethylphenyl)buta-1,3-diene; IPMP – isopropyl methoxypyrazine; IBMP – isobutyl methoxypyrazine; SBMP – sec-butyl methoxypyrazine; ER – Endoplasmic Reticulum