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DIFFERENTIAL AROMA VOLATILES IN NON-CLIMACTERIC NEAR-ISOGENIC LINES OF MELON AS BIOMARKERS OF DIFFERENCES OF FLESH FIRMNESS AT HARVEST

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Table 1. Main aroma volatiles identified in the near-isogenic line (NILs SC7-1 and SC10-2) and the parental line 'Piel de Sapo' (PS). The compounds were arranged according to the random forest (RF) variable importance. Data were the mean relative content in percentage of the probable aromatic compounds identified.

Order	CAS Number	IUPAC Name	Group of compound	PS	SC10-2	SC7-1
1	000600-14-6	pentane-2,3-dione	KET	0,00	0,00	**0,17** *
2	000140-11-4	benzyl acetate	ACE	0,31	0,31	**1,76** *
3	000078-84-2	2-methylpropanal	ALD	0,00	**0,06** *	0,03
4	015764-16-6	2,4-dimethylbenzaldehyde	ALD	0,00	**0,73** *	0,00
5	002040-07-5	1-(2,4,5-trimethylphenyl)ethanone	KET	0,00	**0,12** *	0,00
6	000096-17-3	2-methylbutanal	ALD	0,00	**0,08** *	0,02
7	000111-87-5	octan-1-ol	ALC	0,09	0,21	0,58
8	068920-64-9	methyldisulfanylmethane	SDC	0,27	0,35	**0,52** *
9	000583-57-3	(1R,2S)-1,2-dimethylcyclohexane	ALK	0,00	**0,14** *	0,00
10	019780-39-3	3-ethylheptan-2-ol	ALC	0,06	0,00	**0,49** *
11	001534-08-3	1-methylsulfanylethanone	SDC	0,09	0,00	**0,42** *
12	000098-86-2	1-phenylethanone	KET	1,70	**0,00** *	0,69
13	000629-59-4	tetradecane	ALK	0,15	**0,42** *	0,22
14	005441-52-1	3,5-dimethylcyclohexan-1-ol	ALC	0,33	**0,09** *	0,29
15	000112-40-3	dodecane	ALK	0,04	0,09	0,11
16	018829-55-5	(E)-hept-2-enal	ALD	0,40	0,49	0,53
17	ND	3-methyloctan-2-ol	ALC	0,36	0,71	0,38
18	074367-33-2	(1-hydroxy-2,4,4-trimethyl-pentan-3-yl) 2-methylpropanoate	NAE	1,21	0,78	0,59
19	000624-16-8	decan-4-one	KET	0,15	0,42	0,38
20	000585-74-0 / 000577-16-2	ethanone, 1-(3-methylphenyl) / ethanone, 1-(2-methylphenyl)-	KET	0,33	**0,00** *	0,22
21	003214-41-3	octane-2-5-dione	KET	0,05	0,11	0,12
22	000617-94-7	2-phenylpropan-2-ol	ALC	2,71	**0,23** *	2,31
23	000111-27-3	hexan-1-ol	ALC	0,11	0,07	0,07
24	010340-23-5	(Z)-non-3-en-1-ol	ALC	0,22	0,24	**0,50** *
25	004621-04-10	4-propan-2-ylcyclohexan-1-ol	ALC	0,37	**1,73** *	0,39

NIL means within rows highlighted with * and bold showed statistical differences from PS data, according to a Dunnett's test at P = 0.05. Abbreviations: Acetate Esters (ACE), Alcohols (ALC), Aldehydes (ALD), Alkanes (ALK), Chemical Abstracts Service (CAS), International Union of Pure and Applied Chemistry (IUPAC), Ketones (KET), Non-Acetate Esters (NAE), Not Detected (ND), Others (OTH), Sulphur-Derived Compounds (SDC), Terpenes (TER).

Table 2. Main aroma volatiles identified in the near-isogenic line (NILs SC7-1 and SC10-2) and the parental line 'Piel de Sapo' (PS). The compounds were arranged according to the random forest (RF) variable importance. Volatile precursors and aromatic notes identified in some of the individual aroma volatiles identified in both near-isogenic lines (NILs SC7-1 and SC10-2) and the control the parental 'Piel de Sapo' (PS).

Order	IUPAC NAME	Group of compound	LRI Cal.	LRI Ref.	RT (min)	PRECURSORS		Aromatic Notes
1	pentane-2,3-dione	KET	698	786	2,639	AA	Thr/Met	Caramel, sweet, fruity, buttery, fresh
2	benzyl acetate	ACE	1177	1165	21,419	AA	Phe	Floral, burnt, boiled zucchini
3	2-methylpropanal	ALD	ND	552	1,573	AA	Leu/Val	Green, pungent, burnt, malty, toasted, fruity
4	2,4-dimethylbenzaldehyde	ALD	1220	1175	21,892	AA	Phe	Naphthyl, cherry, almond, spice, vanilla
5	1-(2,4,5-trimethylphenyl)ethanone	KET	1189	ND	21,598	ND		ND
6	2-methylbutanal	ALD	653	682	2,239	AA	Iso	Green, almond, strong burnt, malty, cocoa
7	octan-1-ol	ALC	1075	1087	18,578	ND		Fatty, green, herbal
8	methyldisulfanylmethane	SDC	745	743	3,430	AA	Met	Sulfurous, vegetable, cabbage, onion
9	(1R,2S)-1,2-dimethylcyclohexane	ALK	1180	ND	21,454		Cyclohex. Path	Fuity, floral, vegetable
10	3-ethylheptan-2-ol	ALC	1078	ND	18,870	ND		ND
11	1-methylsulfanylethanone	SDC	701	ND	2,688	AA	Met	Sulfurous, eggy, cheese, dairy ,vegetable, cabbage
12	1-phenylethanone	KET	1070	1070	18,304		α-Methsty.	Sweet, pungent, hawthorn, mimosa, almond, acacia, chemical
13	tetradecane	ALK	1400	1400	22,850	ND		Mild herbaceous, sweet, fusel.like
14	3,5-dimethylcyclohexan-1-ol	ALC	996	ND	13,535	ND		NDc
15	dodecane	ALK	1199	1200	21,762	ND		Fusel-like
16	(E)-hept-2-enal	ALD	956	957	11,312	FaOx.	LA	Sulfury, grassy, fatty, almond.like, pesticide, onion, mushroom, earthy
17	3-methyloctan-2-ol	ALC	1081	ND	18,995	ND		ND
18	(1-hydroxy-2,4,4-trimethyl-pentan-3-yl) 2-methylpropanoate	NAE	1358	ND	22,675	AA	Cys/Met	ND
19	decan-4-one	KET	1149	ND	20,979	ND		ND
20	ethanone, 1-(3-methylphenyl) / ethanone, 1-(2-methylphenyl)-	KET	1152	ND	21,020		Acetoph.	ND / Sweet, hawthorn, powdery, anisic, coumarinic, phenolic, burnt, nutty, honey
21	octane-2-5-dione	KET	988	1118	13,069	FaOx.	Eicosap. acd.	ND
22	2-phenylpropan-2-ol	ALC	1086	1080	19,327	AA	Phe	Mild, green, sweet, earthy
23	hexan-1-ol	ALC	875	880	7,237	Faox.	LA	Flowery, toasty, dry, fruity, herbal, mild woody, sweet, green grass, leafy
24	(Z)-non-3-en-1-ol	ALC	1170	1156	21,297	Faox.	LA	Sweet, green
25	4-propan-2-ylcyclohexan-1-ol	ALC	1150	ND	20,998	ND		Leather, red rose, green, dusty, weedy, metallic

Abbreviations: alfa-Methylstyrene (α-Methsty.), Amino acid (AA), Ciclohexene pathway (Ciclohex. Path.), Cysteine (Cys), Eicosapentanoic acid (Eicosp. acd.), Fatty acid oxidation (FaOx), Identificative Compound Number (ID.Nº), International Union of Pure and Applied Chemistry (IUPAC), Isoleucine (Iso), Leucine (Leu), Linolenic Acid (LA), Linear Retention Time (LRI), Linear Retention Time References (LRI Ref.), Methionine (Met), Mevalonate pathway (Mev. Path.), Not detected (ND), Not detected, but synthetic compound available in the market (NDc), Phenylalanina (Phe), Literature references (Ref.), Average Retention Time (RT) in minutes, Terpenes (Terp), Threonine (Thr), Valine (Val).

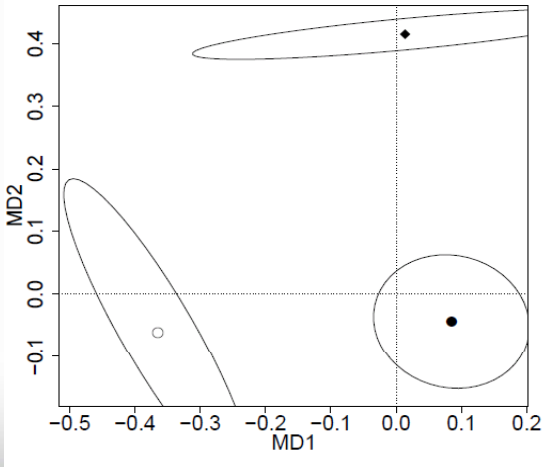

Figure 1. Discrimination among the near-isogenic lines (NILs) SC7-1 (○) and SC10-2 (◆) and the parental control 'Piel de Sapo' (PS,●) using multidimensional scaling (MDS) plots based on random forest (RF) analysis applied to the individual aroma volatiles. Centroids of the datasets for the different lines and 65% confidence ellipses.

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