



SMOKY

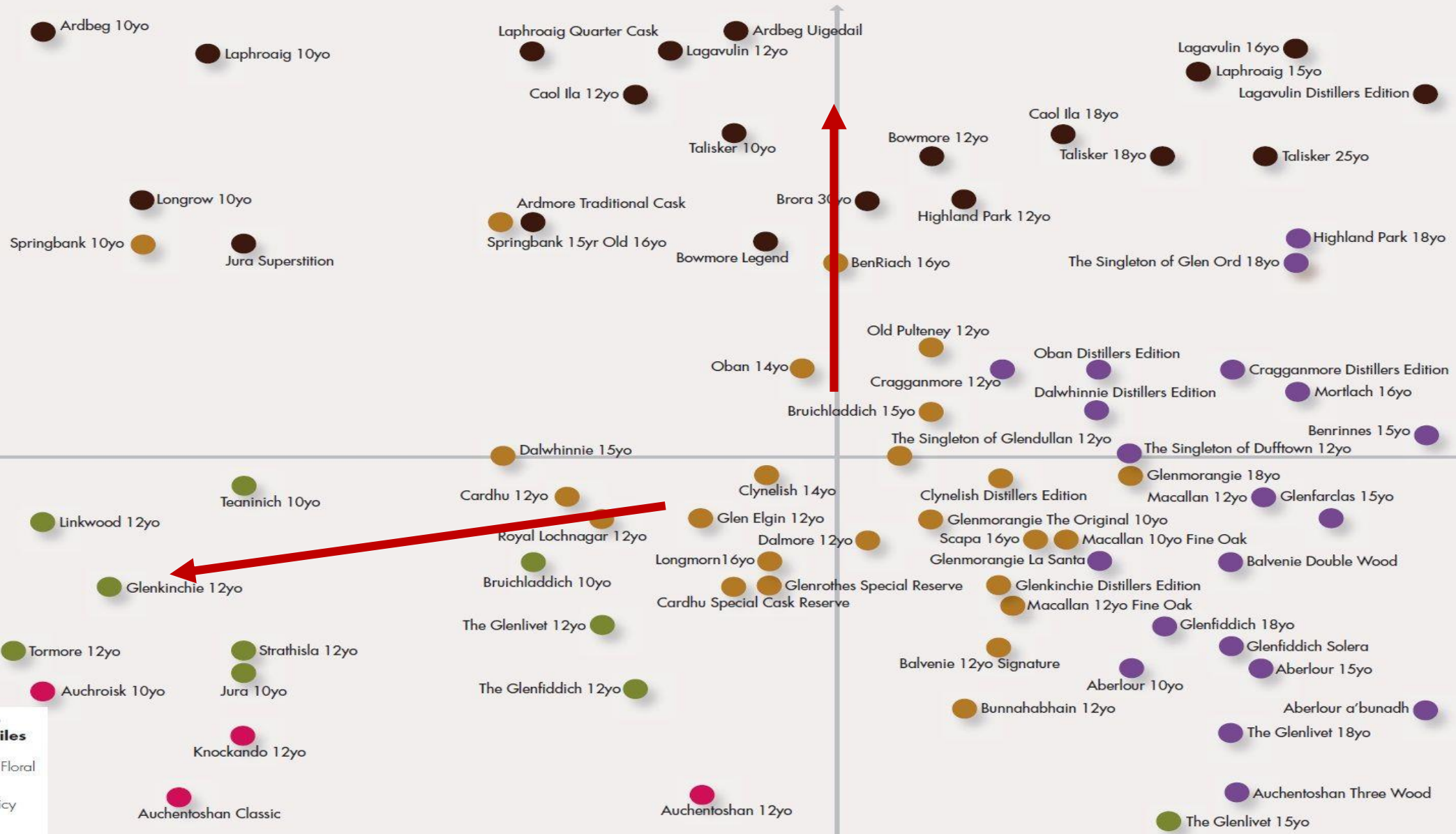
LIGHT

RICH

DELICATE

Five core flavour profiles

- Fragrant & Floral
- Fruity & Spicy
- Malty & Dry
- Rich & Round
- Smoky & Peaty



**MOST
TART**



GRANNY SMITH



PACIFIC ROSE



MCINTOSH



EMPIRE



JAZZ



BRAEBURN



LADY



ENVY



CORTLAND



MACOUN



AUTUMN
GLORY



OPAL



SUGARBEE



SMITTEN



JONAGOLD



GOLD
DELICIOUS



RED
DELICIOUS



SNAPDRAGON



HONEYCRISP



JUICI



AMBROSIA



GALA



FUJI

**MOST
SWEET**

SWEET-O-METER

CMI ORCHARDS
[509] 663-1955
www.cmiorchards.com



SWEET

★ KIKU®



Super Sweet & Juicy.
Quite possibly the sweetest apples you'll ever taste. Incredibly juicy and crisp.

FUJI



Sweet & Juicy
Dense white flesh that is low in acid, crisp and sweet. A fan favorite.

★ ENVY™



Incredibly Crisp & Sweet
Sweet, firm white flesh that is slow to brown when cut. Perfect for snacking and desserts.

★ AMBROSIA™



Sweet as Honey
Crisp and juicy with a unique honey-like flavor. America's newest favorite apple.

GALA



Sweet and Mild
Creamy white flesh with low acidity. Mild and pleasant with a perfect sugary sweet balance.

JONAGOLD



Crisp & Juicy
Mild flavor with slight acidity and pleasant aroma. Firm texture and crunch.

★ PACIFIC ROSE™



Sweet & Refreshing
Pretty all-over blushed appearance and incredibly unique flavor.

GOLDEN DELICIOUS



Mild and Balanced
Sweet, crunchy with a hint of acid to balance its flavor. A wonderful cooking apple.

RED DELICIOUS



Dark Red and Mild
A dense, mild apple with a very distinct shape and crunch.

HONEYCRISP



Sweet, Tart & Aromatic
Refreshing, sweet flesh with exceptional crunch and juice.

★ KANZI®



Intense Flavor
Extreme juice and crunch with a flavor punch. One of Europe's favorite apples.

BRAEBURN



Tangy and Crisp
A dense, high acid apple that's juicy and crisp. Perfect for pairing with savory dishes.

★ JAZZ®



Tangy Effervescence
Sweetly tart with an intense crunchy, fresh flavor and zing. A firm texture with tang.

PINK LADY®



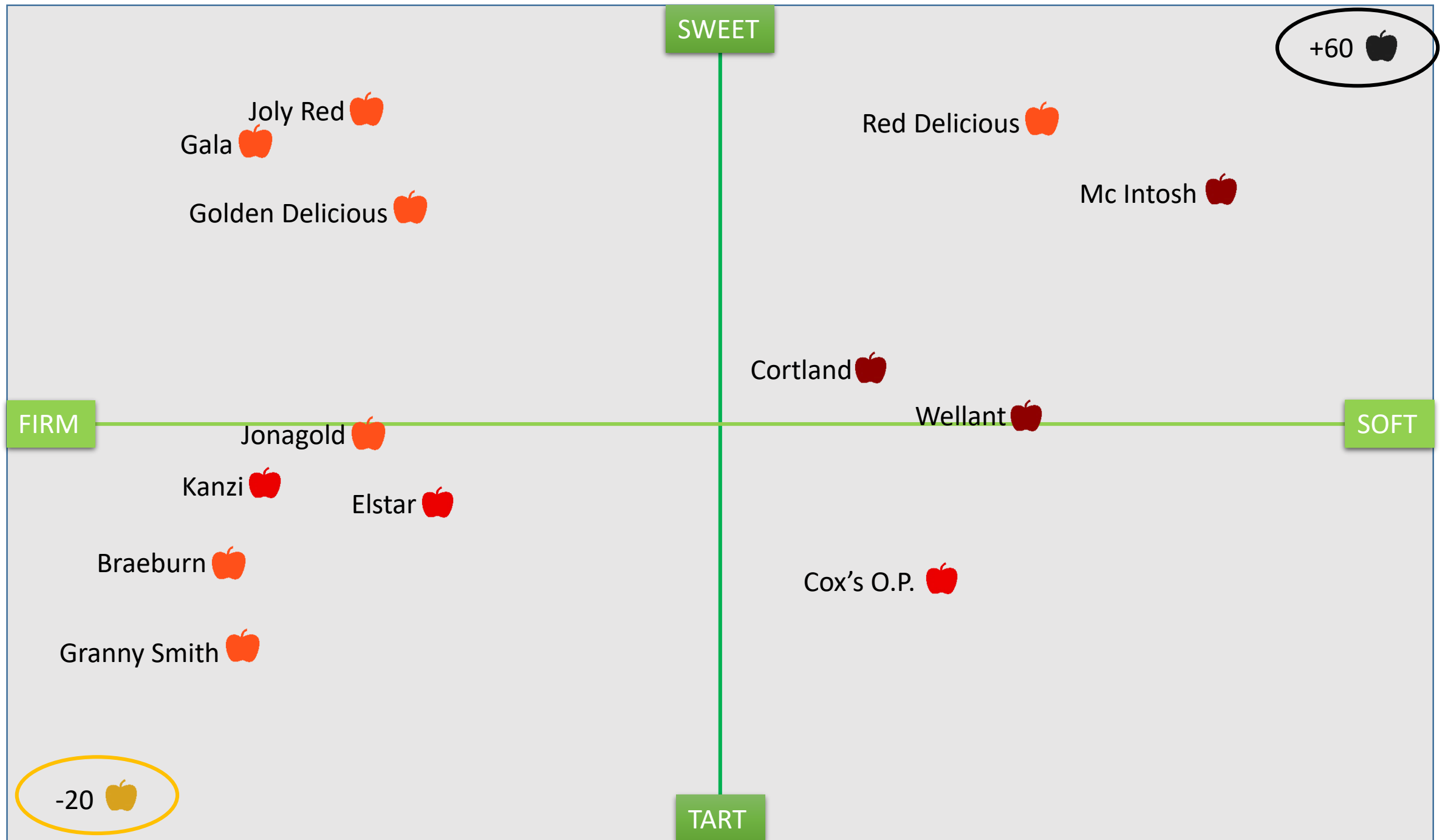
Dense, Tangy & Sweet
Firm flesh with a balanced sweet/tart bite and pretty pink-blushed appearance.

TANGY

GRANNY SMITH



Tart, Acidic and Subtly Sweet
Firm and juicy with a thick skin and amazing tartness perfect for fresh apple pie.





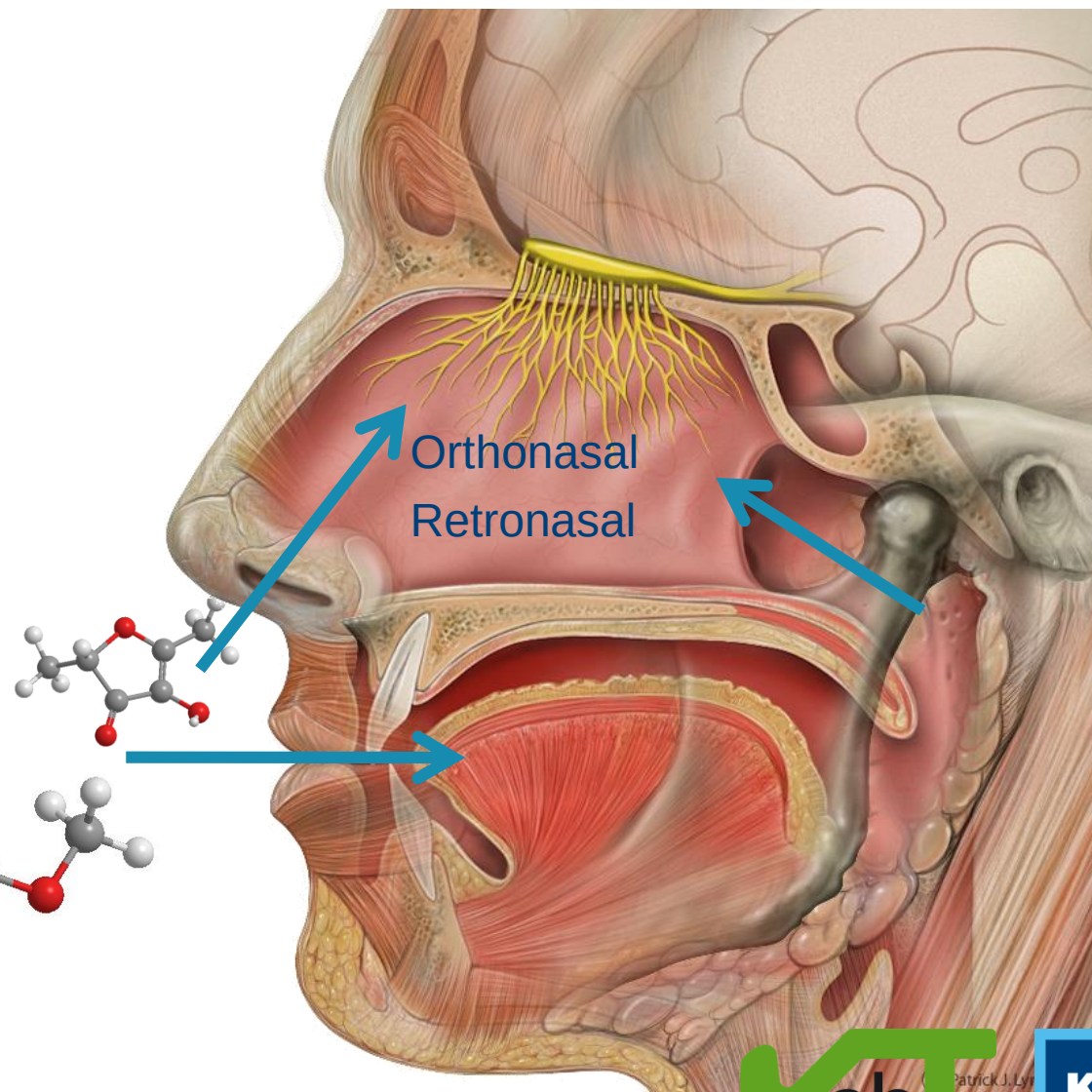
TASTE OF APPLE AND PEAR WILL MAKE THE DIFFERENCE

How we can translate subjective taste in
objective figures and models ?

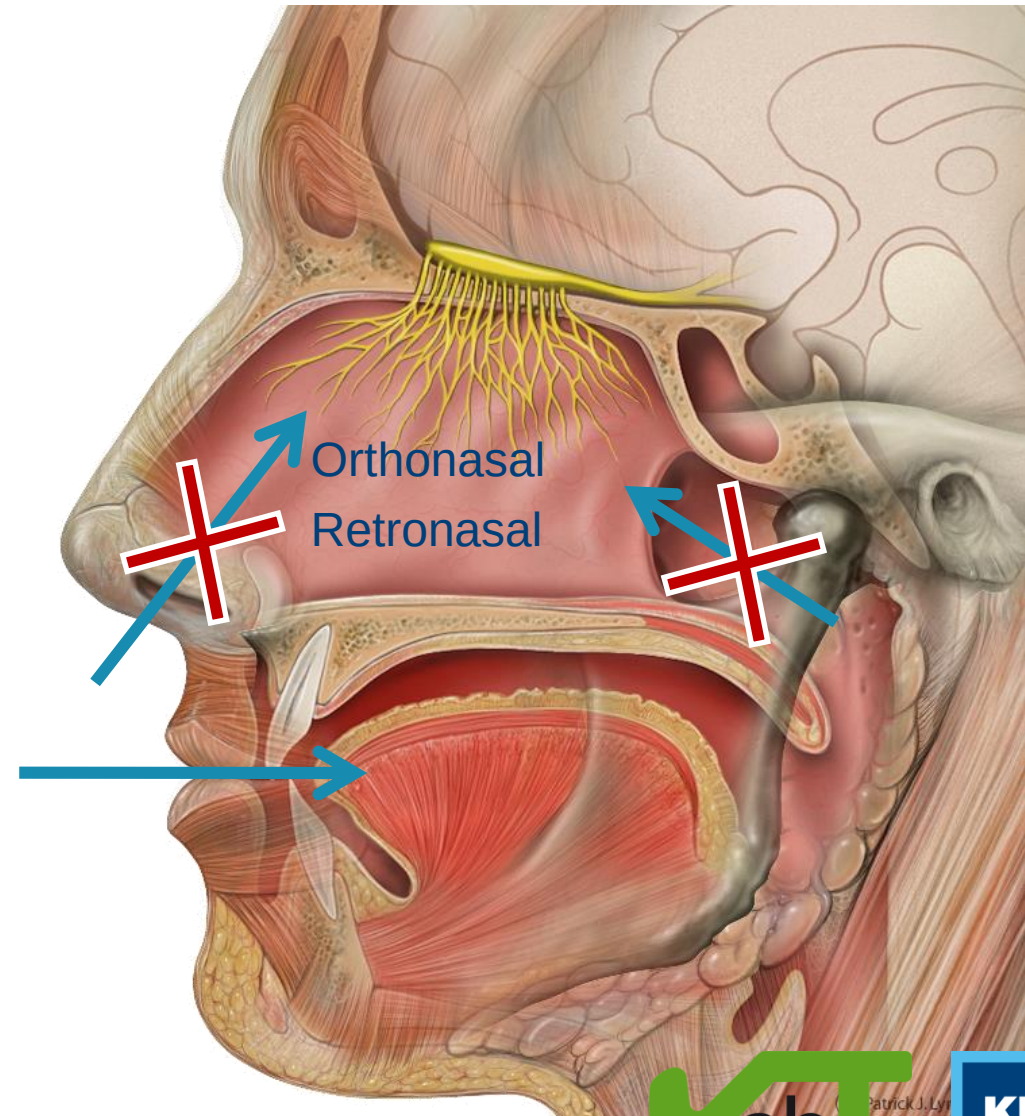
Ann Schenk, Bart Nicolai
Flanders Centre of Postharvest Technology (VCBT)
Maarten Hertog
MeBioS KU Leuven



Flavour sensation = taste + Aroma



Flavour sensation = taste + Aroma

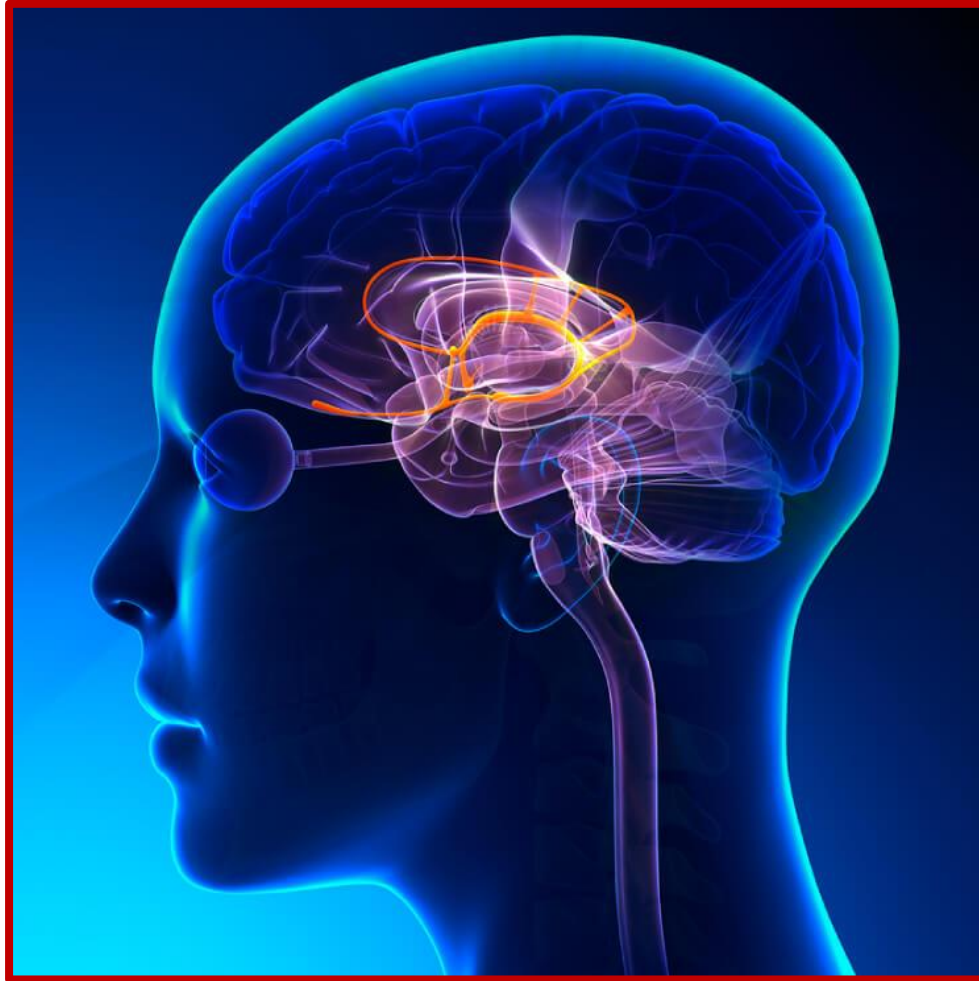


Flavour sensation = Taste + Aroma

- Sweet
- Sour
- Bitter
- Salty
- Umami
- Sweet : sour



Flavour and emotion



Everything is chemistry

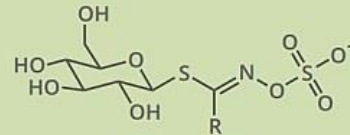


The chemistry of taste

THE CHEMISTRY OF BRUSSELS SPROUTS



THE BITTER TASTE OF SPROUTS

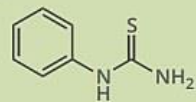


GLUCOSINOLATES

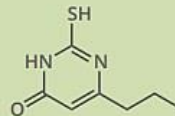
Family of compounds in cruciferous vegetables

Glucosinolates are a class of compounds found naturally in a range of green vegetables, including brussels sprouts. They are broken down into compounds called isothiocyanates when the plant is damaged or cooked.

These isothiocyanates have similarities with the synthetic compounds PTC & PROP. PTC only tastes bitter to around 70% of people. To the other 30%, it is completely tasteless. Although it is not the only factor in dislike of brussels sprouts, ability to taste PTC & PROP and sensitivity to bitter vegetables appear to be strongly correlated, and has a heritable genetic basis.



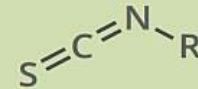
PHENYLTHIOCARBAMIDE
(PTC)



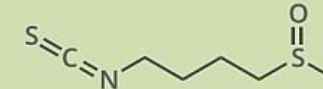
PROPYLTHIOURACIL
(PROP)



POTENTIAL BENEFITS OF SULFORAPHANE



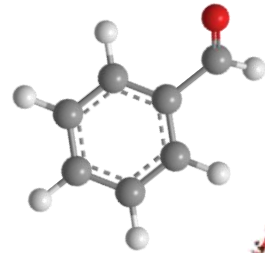
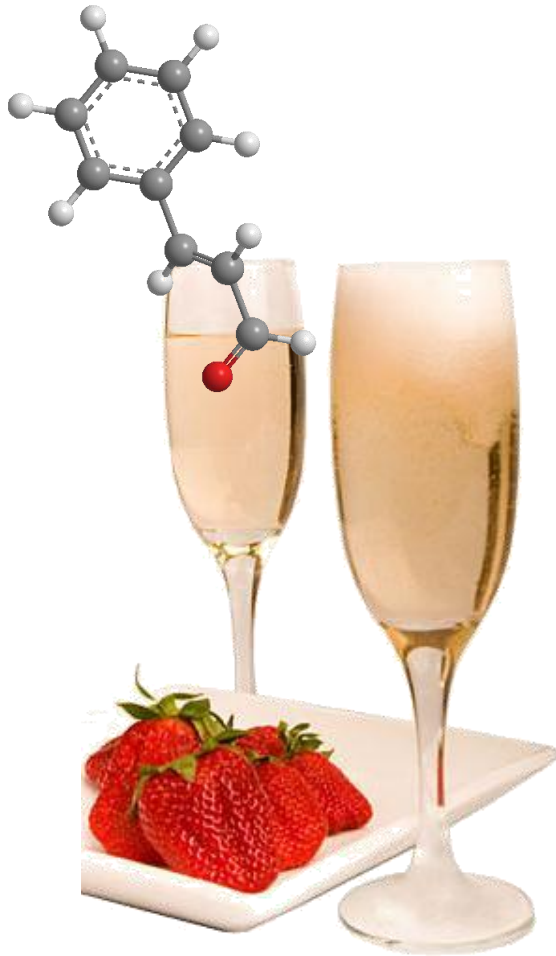
ISOTHIOCYANATES
Breakdown products of glucosinolates



SULFORAPHANE
Formed from glucosinolates

One of the isothiocyanates that glucosinolates can be broken down into is sulforaphane. This compound is partly responsible for the bitterness of overcooked brussels sprouts, but it is also being studied for its antioxidant properties. Additionally, it has been suggested that it could have a protective effect against neurodegenerative disorders, but more research is required to investigate this.

Aroma and taste components



Esters

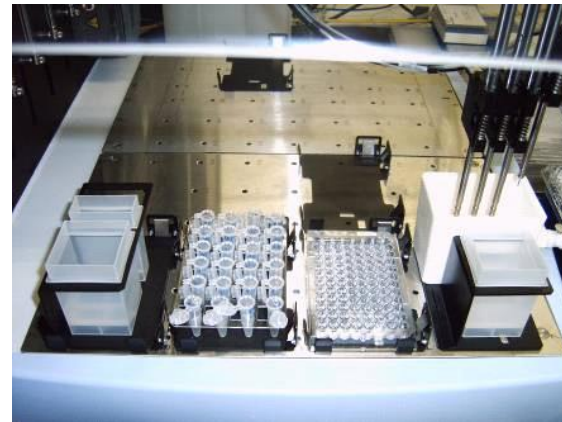
Table of esters and their smells

from the carboxylic acid (second word)

from the alcohol (first word)

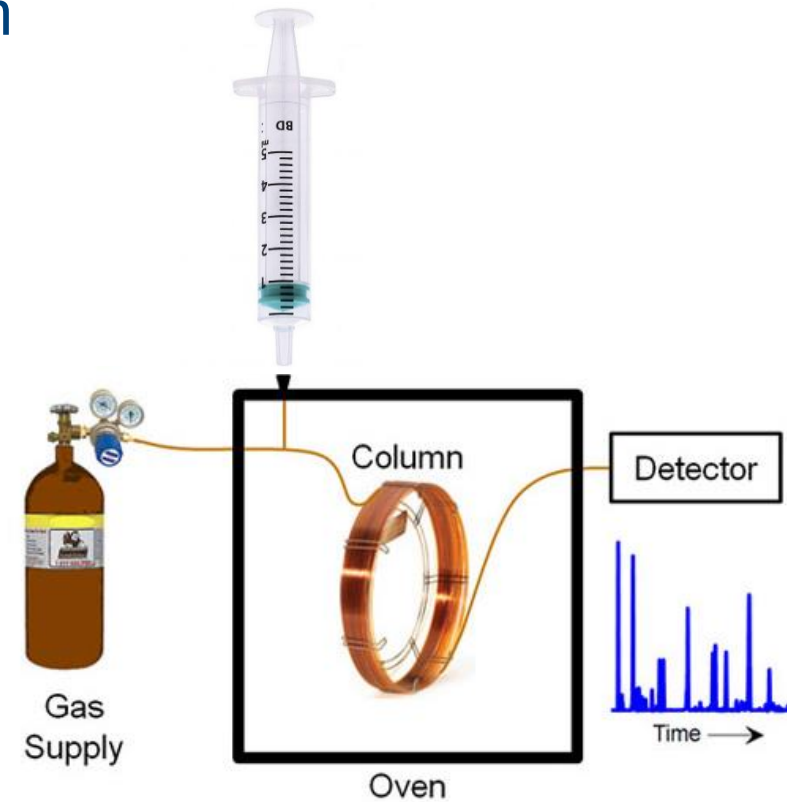
	methyl 1 carbon	ethyl 2 carbons	propyl 3 carbons	2-methyl propyl-	butyl 4 carbons	pentyl 5 carbons	hexyl 6 carbons	benzyl benzene ring	heptyl 7 carbons	octyl 8 carbons	nonyl 9 carbons
methanoate 1 carbon	ETHEREAL			ETHEREAL							?
ethanoate 2 carbons											
propanoate 3 carbons											?
2-methyl propanoate 4 carbons, branched		ETHEREAL									?
butanoate 4 carbons											?
pentanoate 5 carbons					ETHEREAL					?	?
hexanoate 6 carbons											
benzanoate benzene ring											
heptanoate 7 carbons						?					?
salicylate from salicylic acid											?
octanoate 8 carbons											
nonanoate 9 carbons											?
cinnamate											?
decanoate 10 carbons							?	?	?	?	?

Analytical measurements

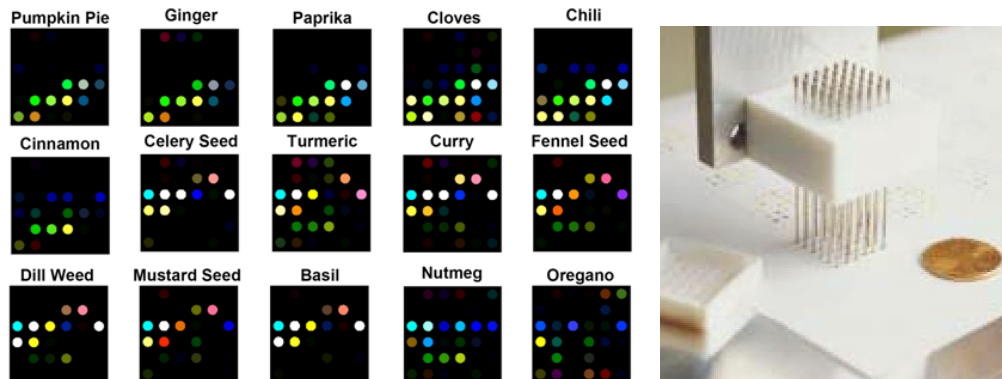
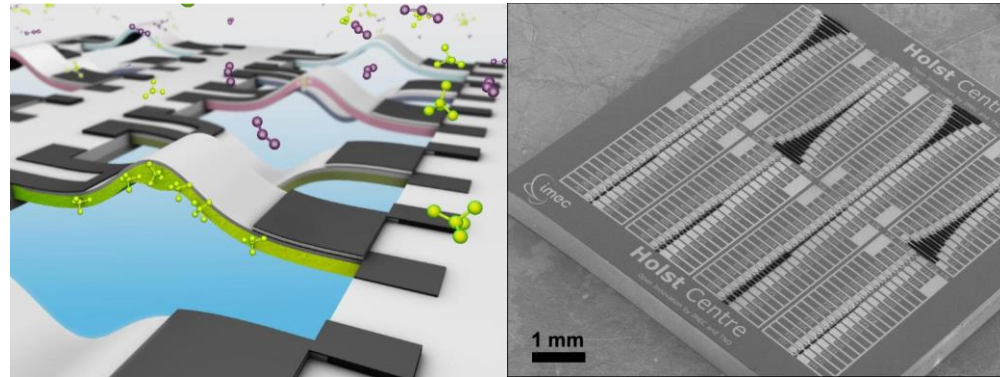


Faster...

- Fast GC-MS
 - Faster separation - 30 min > 7 min
- MS-nose
 - No separation of components



Simple...



Fast and simple

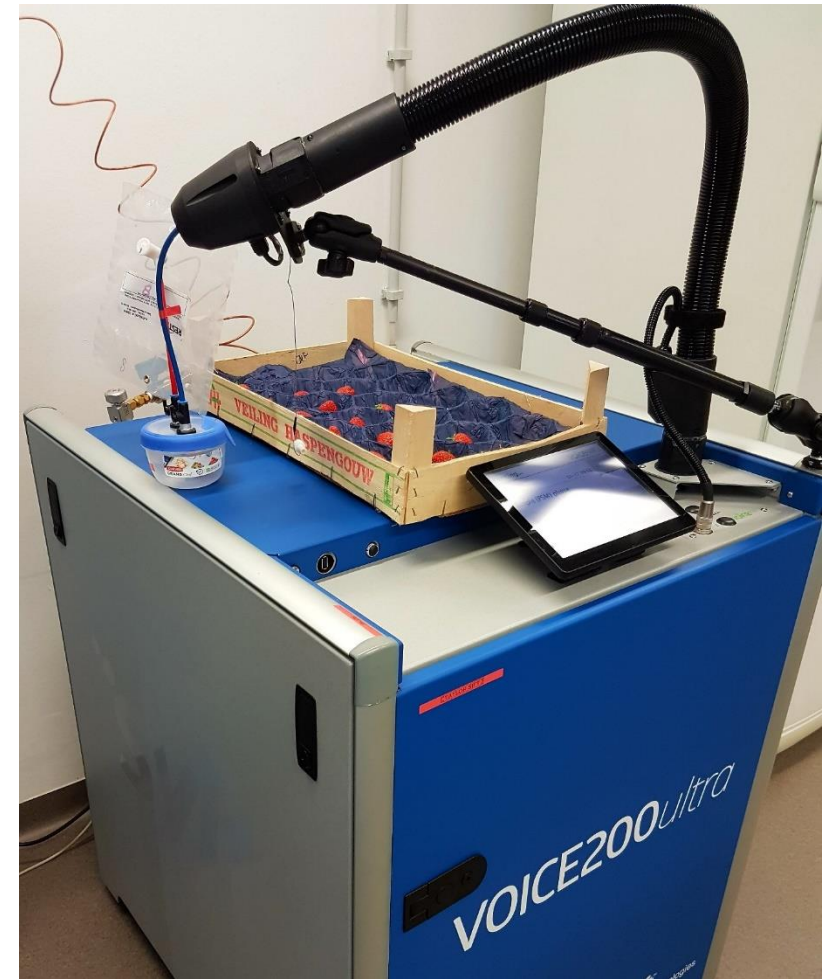
- Ion Mobility Spectrometry / SIFT-MS
- Fingerprinting - Analytical
- Fast
- Sensitive
- Very robust
- Online applicable



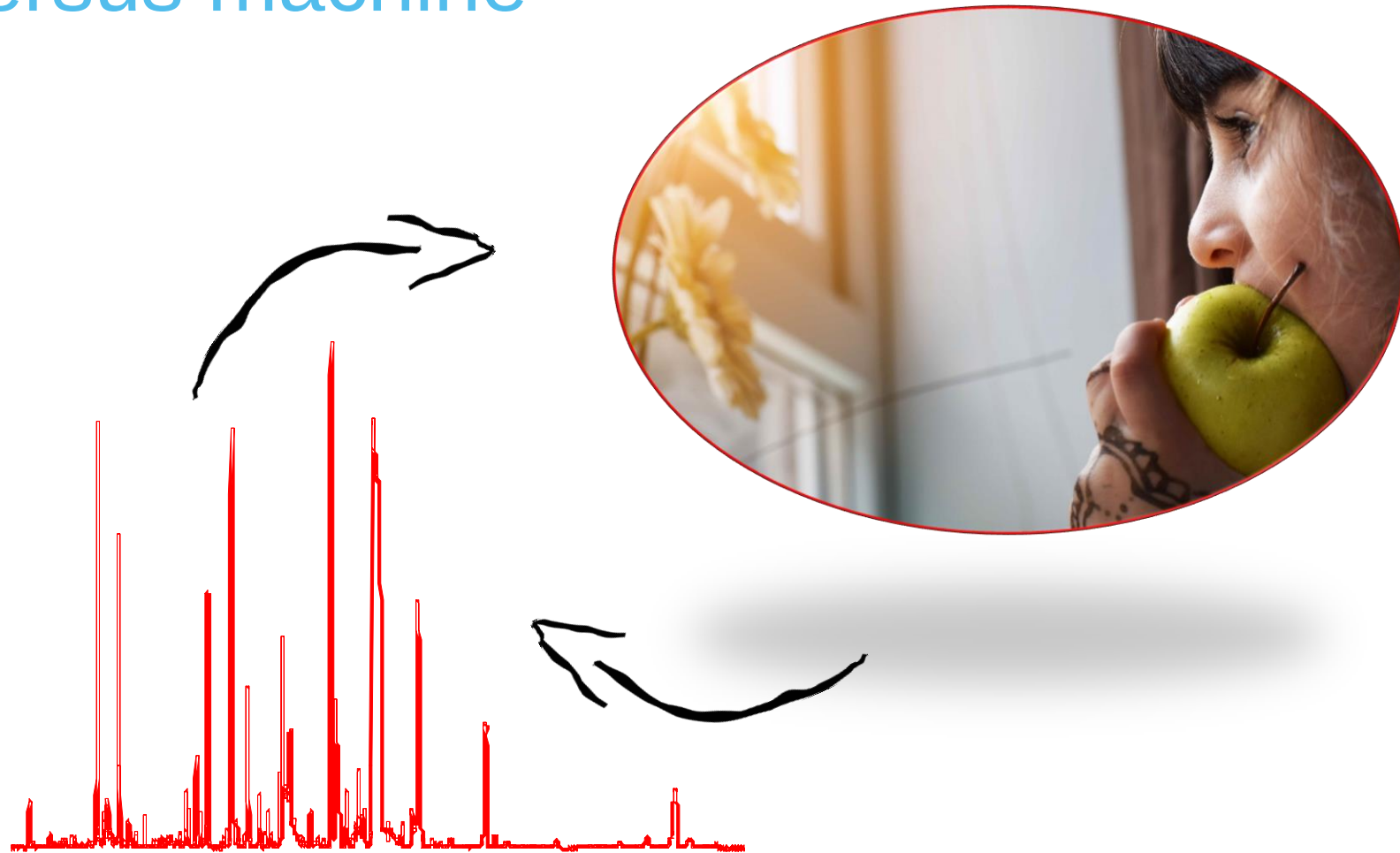
Owlstone faims



GAS FlavourSpec ims

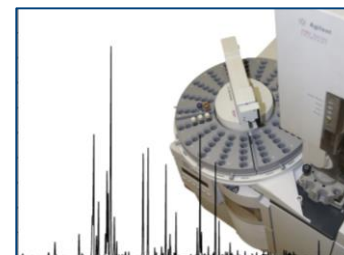
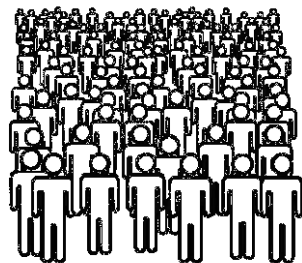


Human versus machine

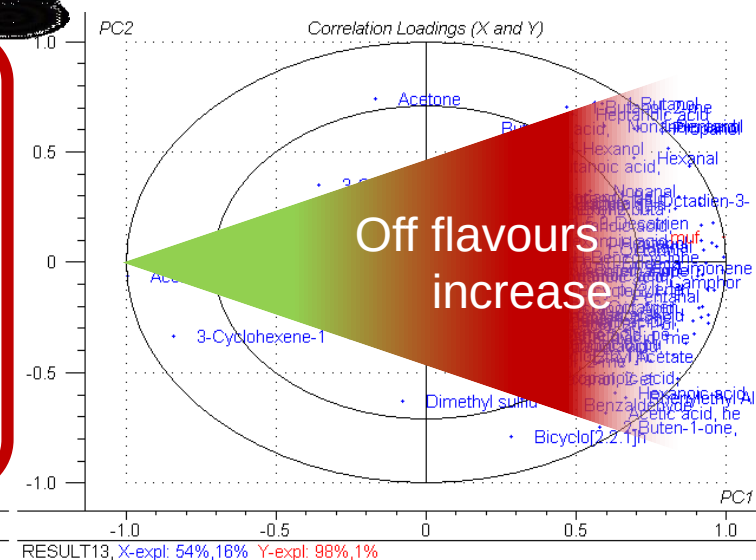
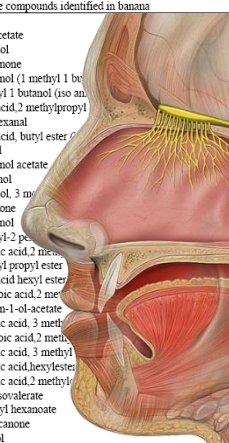


Threshold levels

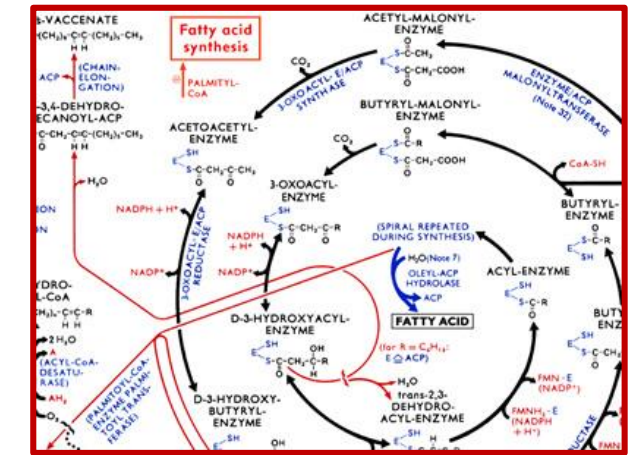




	Retention time (min)	Volatile compounds identified in banana
1	1.9	butanal
2	2.023	ethyl acetate
3	2.368	1 butanol
4	2.563	2 pentanone
5	2.7	2 pentanol (1 methyl 1 butanol)
6	3.163	3 methyl 1 butanol (iso amyl alcohol)
7	3.764	acetic acid, 2 methylpropyl ester
8	4.211	2 (Z) hexenal
9	4.552	acetic acid, butyl ester
10	5.216	hexenal
11	5.43	2 pentanol acetate
12	5.882	1-hexanol
13	6.136	1 butanol, 3 methyl
14	6.402	heptanoate
15	6.747	2 heptanol
16	8.12	4 methyl-2-pentanol
17	8.423	butanoic acid, 2 methyl ester
18	9.77	1 methyl propyl ester
20	10.361	acetic acid hexyl ester
21	10.825	propanoic acid, 2 methyl ester
22	11.453	3 hepten-1-ol-acetate
23	11.527	butanoic acid, 3 methyl ester
24	11.962	propanoic acid, 2 methyl ester
26	13.597	butanoic acid, 3 methyl ester
27	16.607	butanoic acid, hexylester
28	17.45	butanoic acid, 3 methyl ester
29	18.321	hexyl isovalerate
30	18.585	isopentyl hexanoate
31	20.024	2-octadecanone
32	21.827	Eugenol



Off flavours increase



Statistics

- Ripening and screening of pear cultivars with SIFT-MS
- 3 cultivars
- Day 1, 5 and 8

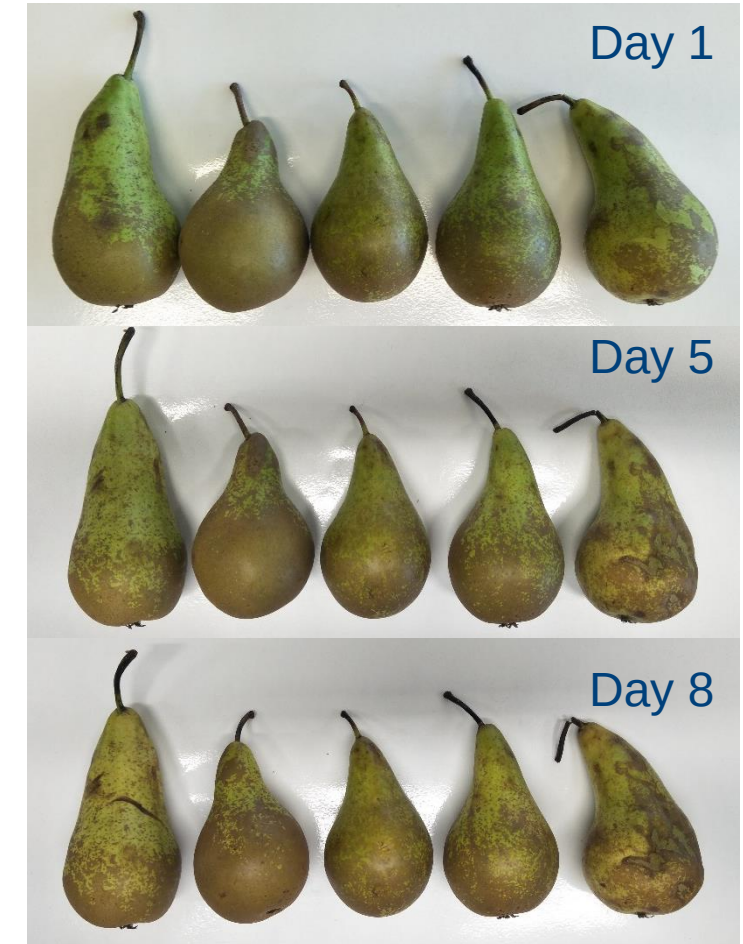
1. Williams



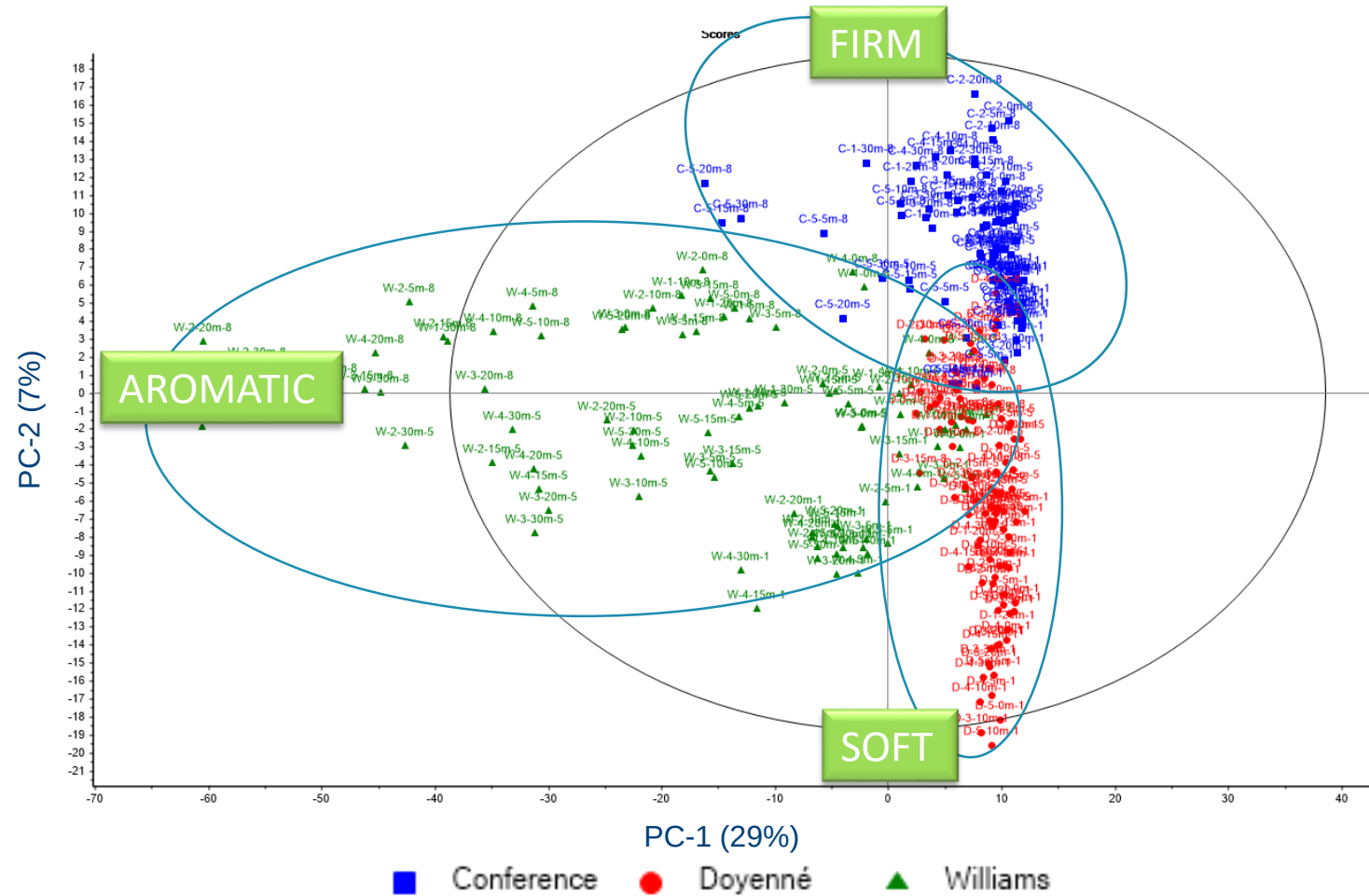
2. Doyenné



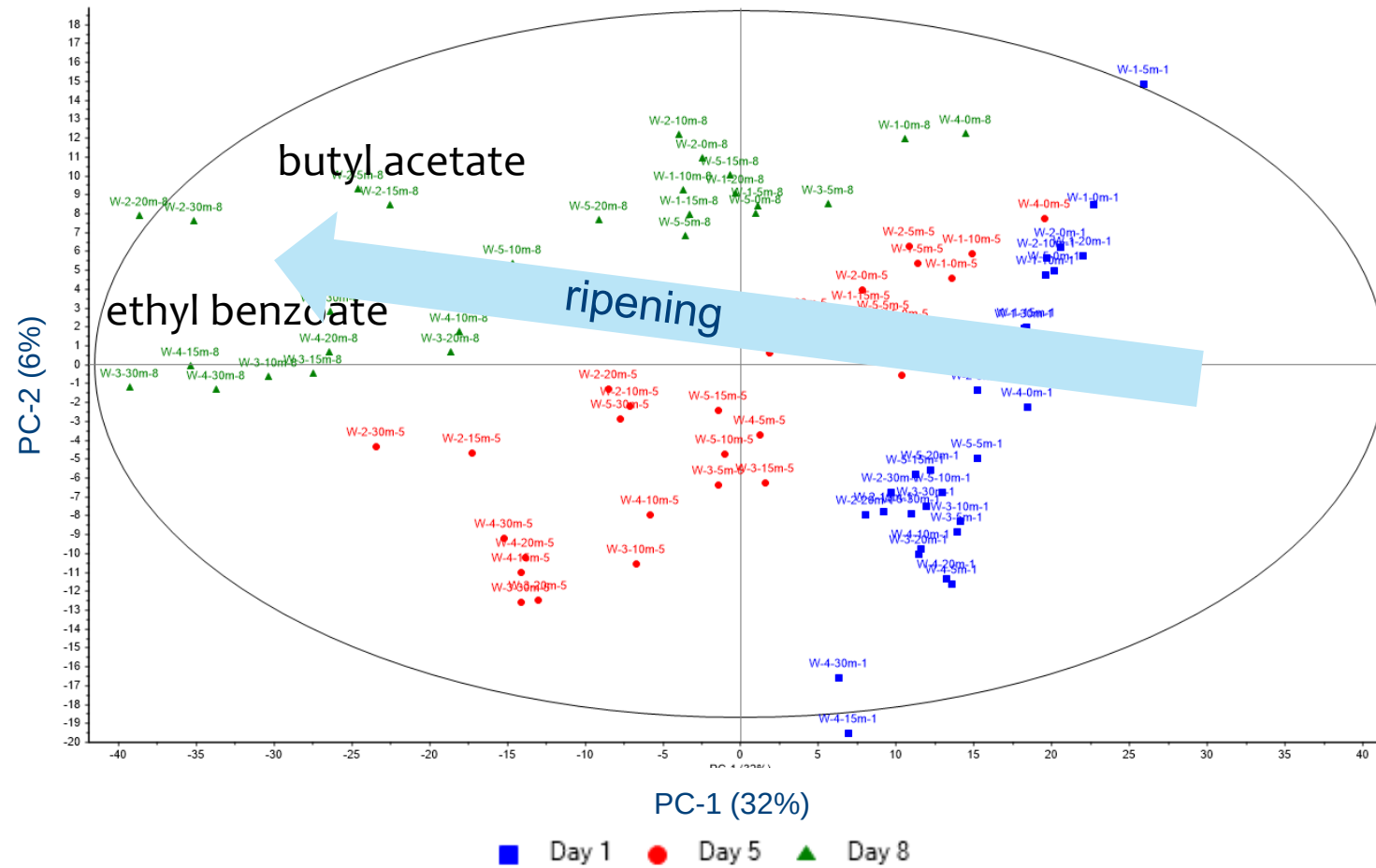
3. Conference



PCA – Aroma of 3 cultivars at 3 different days



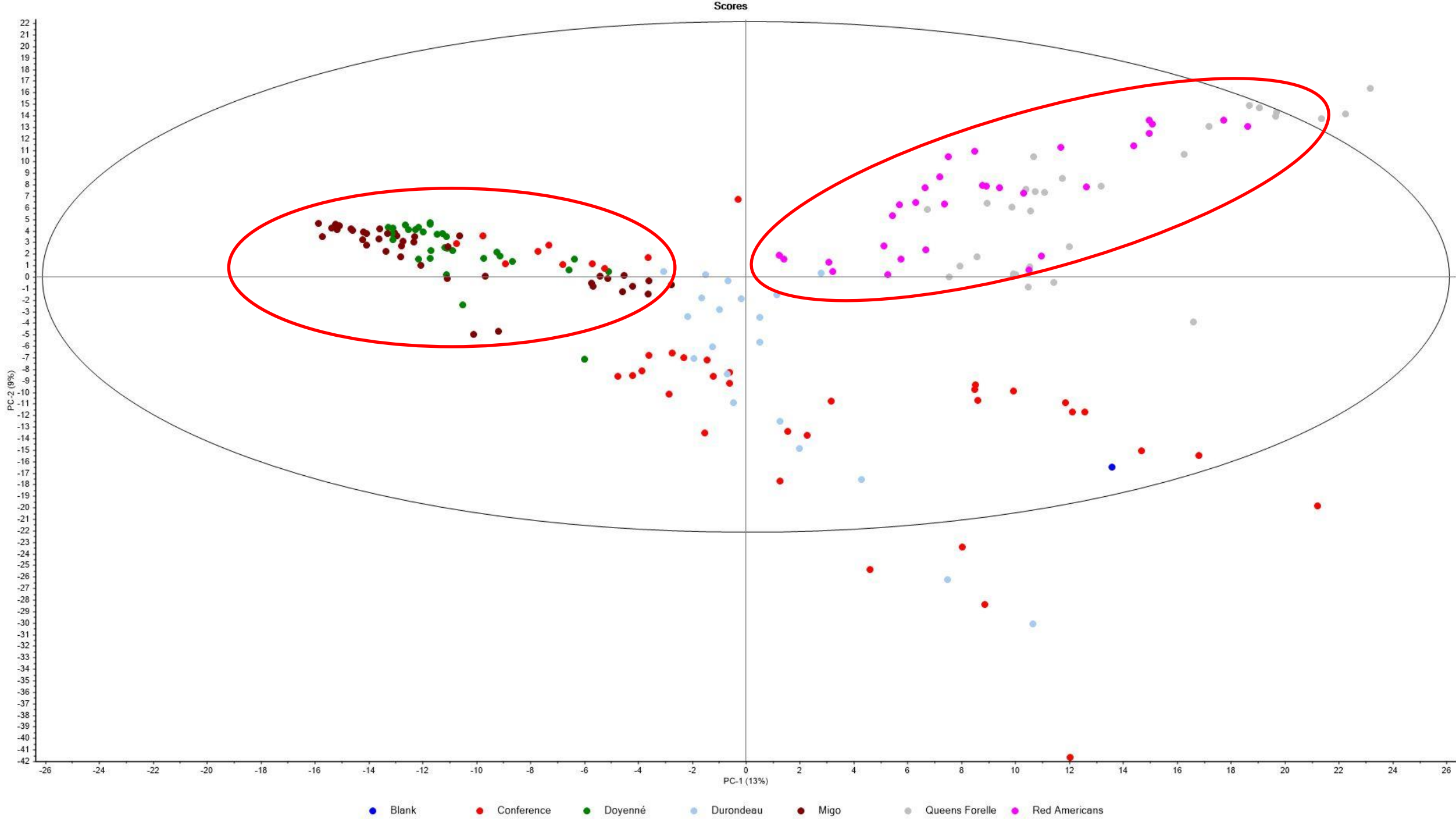
Aroma of ripening cv. Williams: 3 different days

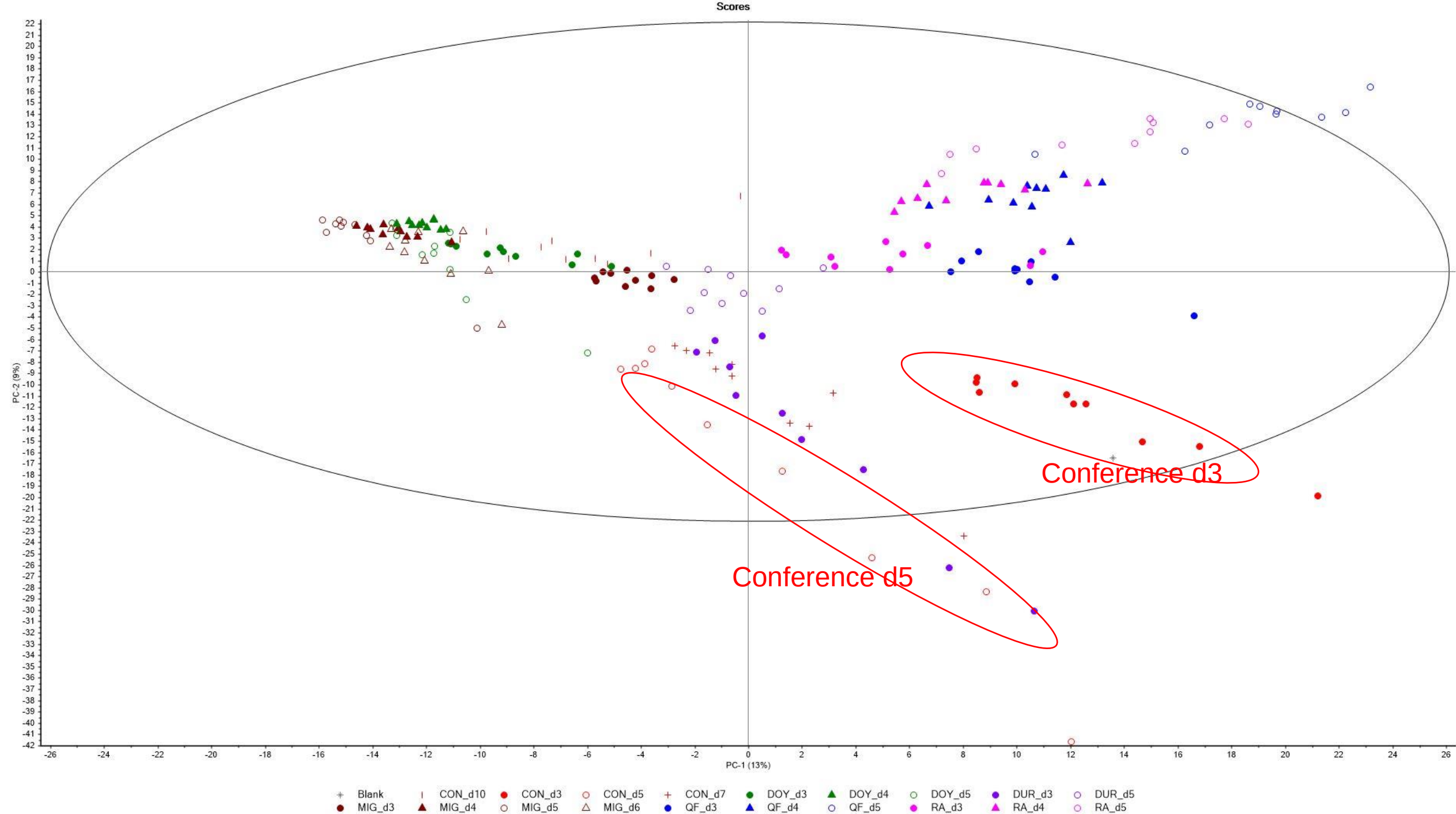


Pear cultivar screening

- Conference
- Doyenné
- Durondeau
- Migo®
- Queen's Forelle®
- Red American pear
- Ripening pattern







Multivariante

A large, bold, dark gray 'Yes!' is written diagonally across the frame. A thick, vibrant green checkmark is drawn over the word, starting from the bottom left and curving upwards to the right. The checkmark is drawn with a green pencil, which is visible at the top right of the image, pointing towards the end of the checkmark. The pencil has a green body and a sharpened wooden lead tip. The background is a plain, light gray.

SWEET

+60 🍏

Joly Red 🍏
Gala 🍏

Red Delicious 🍏

Golden Delicious 🍏

Mc Intosh 🍏

Cortland 🍏

FIRM

Jonagold 🍏

Wellant 🍏

SOFT

Kanzi 🍏

Elstar 🍏

Braeburn 🍏

Cox's O.P. 🍏

Granny Smith 🍏

-20 🍏

TART



More info:

vcbt.be

www.biw.kuleuven.be/biosyst/mebios/postharvest-group

