Volatile Aroma Panel

Fruit aroma is tightly related to flavor chemistry and a common target in phenotypic screening during selective breeding. DHMRI's Volatile Aroma Panel affords the quantitative measurement of select aroma compounds, which can be used to understand the phenotypic profiles of fruit and vegetable crops in breeding programs. When used in conjunction with sensory information, this data is an important determinant of how specific compounds correlate to taste perception.

This analysis provides the quantitative measurement of 58 volatile aroma compounds commonly associated with sensory/flavor perception across a variety of fruits and vegetables. We use solid phase microextraction (SPME) coupled with gas chromatography-mass spectrometry (GC-MS) for this panel and have applied it across a broad range of crops, including melons, blueberries, tomatoes, and peppers. The versatility of the analysis also allows for customization to the crop of interest by incorporating additional standards.

Highlights

- Quantitative analysis of the volatile aromatic compounds common in fruit and vegetable crops.
- Versatile assay allows for customization by addition of compounds to the main panel.

Deliverables

- Table containing concentrations of compounds in units specified by the client, e.g., ppb, mol dm^{-3}, etc.

Sample Submission

- Submit fresh crop samples or pre-processed homogenized frozen purees.

Assay Performance

Conducting the assay using blueberry samples revealed the parameters listed in Table 1 for quantitated compounds, which have previously been identified in other fruits, including cantaloupe and tomatoes. The average inter-assay coefficient of variation (CV) is 7.4%, and the lower limit of quantification (LLOQ) demonstrates the potential of the panel to detect compounds at concentrations as low as 200 pg/g.

Table 1: Selected lower limit of quantitation data.

Compound	LLOQ (ppb)	CV
1-Butanol, 2-methyl-, acetate	0.19	7.2
1-Butanol, 3-methyl-	0.18	8.8
1-Hexanol	0.18	8.0
1-Penten-3-ol	0.18	6.6
2-Heptanone	0.18	5.1
2-Penten-1-ol, (Z)-	8.69	11.4
3-Hexen-1-ol	1.87	5.8
5-Hepten-2-one, 6-methyl-	0.19	2.8
Acetic acid, butyl ester	0.20	7.0
Acetic acid, hexyl ester	0.18	5.2
Benzaldehyde	0.23	4.5
Butanoic acid, 2-methyl-, ethyl ester	0.18	10.8
Butanoic acid, 2-methyl-, methyl ester	0.18	9.5
Butanoic acid, ethyl ester	0.17	7.2
Ethyl (methylthio)acetate	1.04	7.1
Hexanoic acid, ethyl ester	0.17	3.5
Hexanoic acid, methyl ester	0.18	8.4
Nonanal	0.98	11.7
Octanal	0.18	5.3
Phenylethyl Alcohol	1.02	12.3
Propanoic acid, ethyl ester	0.17	7.8

DHM | RI

150 Research Campus Drive,
Kannapolis, NC 28081

www.dhmri.org +1 704-250-2600 info@dhmri.org

Table 2: List of 58 quantifiable volatile aromatic compounds.

1,8-Cineole	Acetic acid ethyl ester	Ethyl 3-(methylsulfanyl)propanoate
1-Butanol, 2-methyl-, acetate	Acetic acid, butyl ester	Ethyl isobutanoate
1-Butanol, 3-methyl-	Acetic acid, hexyl ester	Ethyl isovalerate
1-Heptanol	Acetic acid, propyl ester	Geraniol
1-Hexanol	alpha-Pinene	Geraniol acetate
1-Pentanol	alpha-Terpineol	Heptanal
1-Penten-3-ol	Benzaldehyde	Hexanal
2,6-Nonadienal, (E,Z)-	Benzeneacetaldehyde	Hexanoic acid, ethyl ester
2-Heptanol	Benzoic acid, ethyl ester	Hexanoic acid, methyl ester
2-Heptanone	Benzyl acetate	Isopentyl acetate
2-Hexen-1-ol, (E)-	beta-Carophylene oxide	Limonene
2-Hexen-1-ol, (Z)-	beta-Damascenone	Linalool
2-Hexenal, (E)-	beta-Pinene	Neral
2-Nonanone	Butanal, 2-methyl-	Nonanal
2-Penten-1-ol, (Z)-	Butanoic acid, 2-methyl-, ethyl ester	Octanal
2-Undecanone	Butanoic acid, 2-methyl-, methyl ester	Pentanal
3-Hexen-1-ol	Butanoic acid, 3-hexenyl ester, (Z)-	Phenylethyl Alcohol
3-Hexen-1-ol, acetate, (Z)	Butanoic acid, 3-methyl-, methyl ester	Propanoic acid, ethyl ester
4-Terpineol	Butanoic acid, ethyl ester	
5-Hepten-2-one, 6-methyl-	Ethyl (methylthio)acetate