



## Soft fruit and human Health Activities in Sub-task 3.1.2 Internal fruit quality – complex chemistries, (micro)nutrients and nutraceuticals



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D3.1 Delivery of standard operating procedures for all analytical approaches with respect to fruit quality and composition and sensory parameters (P1, P3, P10, P14). Month 6

M3.2 Development of SOPs for all analytical approaches with respect to fruit quality and composition (P1, P3). Month 6.

- Extraction of polyphenolics from berries
  - 0.5% formic acid in acetonitrile
- Quantification of ascorbic acid in berries
  - by reversed phase HPLC (UV detection) with or without dehydroascorbic acid
- Quantification of sugars in berries
  - by anion exchange HPLC (pulsed amperometer detector). Normally glucose, fructose, sucrose
- Quantification of organic acids in berries
  - by anion exchange HPLC (electrochemical detector). Normally citrate, malate and oxalate but also fumarate, isocitrate, succinate and tartarate
- Measurement of total anthocyanins in berries by pH differential method
- Measurement of total phenols in berries
  - using Folin Ciocalteu reagent
- Total antioxidant capacity of berries
  - Trolox Equivalent antioxidant capacity (TEAC) using ABTS
- “Antioxidant power” of berries
  - using ferric reducing ability of plasma (FRAP)

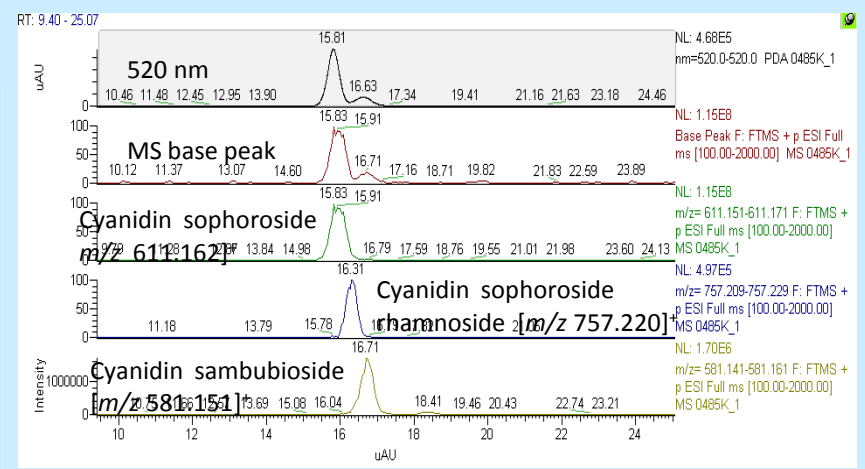
Analysis of polyphenolics in raspberry, blackberry, blueberry, black currant and strawberry:

- by high pressure liquid chromatography-photodiode array-mass spectrometry (HPLC-PDA-MS) - 150 mm x 2.0 mm; 4 µm column, nominal mass
- by ultra high pressure liquid chromatography-photodiode array-mass spectrometry (UPLC-PDA-MS) - 50 mm x 2.1 mm; 1.9 µm column, nominal mass
- by high pressure liquid chromatography-photodiode array-high resolution-mass spectrometry (HPLC-PDA-HR-MS) - 150 mm x 2.0 mm; 4 µm column, accurate mass

Molecular weight and MS2 information of anthocyanins, flavonols, ellagic acid derivatives, ellagitannins and proanthocyanidins

Compound	Formula	MS	MS2
<b>Anthocyanins</b>		<b>[M+H]<sup>+</sup></b>	
Cyanidin 3-sophoroside	C <sub>27</sub> H <sub>30</sub> O <sub>16</sub>	611.161	287
Cyanidin 3,5-diglucoside	C <sub>27</sub> H <sub>30</sub> O <sub>16</sub>	611.161	449, 287
Cyanidin 3-(2'-glucosyl)rutinoside	C <sub>33</sub> H <sub>40</sub> O <sub>20</sub>	757.219	287
Cyanidin 3-sophoroside-5-rhamnoside	C <sub>33</sub> H <sub>40</sub> O <sub>20</sub>	757.219	611, 433, 287

Ion chromatograms





# Cultivars/ genotypes grown at JHI for quality analysis (linked to WP1, 2012 season)



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M3.1 Generation of germplasm for quality, nutritional/nutraceutical and bioactivity assessments (P1, P2, P3, P5, P6, P10). Month 28.

- Black currant - **Ben Gairn**, **Ben Finlay**, **Ben Maia**, **Big Ben**, JHI-P8/5/24, JHI-91129-1, JHI-94120-1, JHI-9998-1 (8)
  - Some cultivars/genotypes available from different fields at JHI and additionally from farm at Maidstone
- Raspberry - **Glen Fyne**, **Glen Doll**, **Glen Ericht**, Glen Cally, **JHI - 0485K-1**, JHI - 0304F6, **JHI - 0019E2**, JHI - 00123A7, **JHI - 0534RB1**, JHI - 0435D-3 (10)
  - Simple sensory data available; general score 1-9, aroma, acidity, sweetness
- Blueberry - Hortblue Petite (NZ), Nui (NZ), Reka (NZ), Elliott, Poppins, Bluecrop, Berkeley, D100 (NZ), RH38 (NZ), RH48 (NZ), RH52 (NZ), RH55 (NZ), F100 (NZ), ZDM 005 (NZ), ZDM 035 (NZ), ZDM 075 (NZ), WE 158-10 (NZ) (17)
- Blackberry – deferred to 2013

Small amounts of frozen berries available from 2011 for cultivars/genotypes in red