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# EFFECT OF CULTURAL TREATMENTS ON VIDAL BLANC WINES

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# How do vineyard management practices affect wine quality?

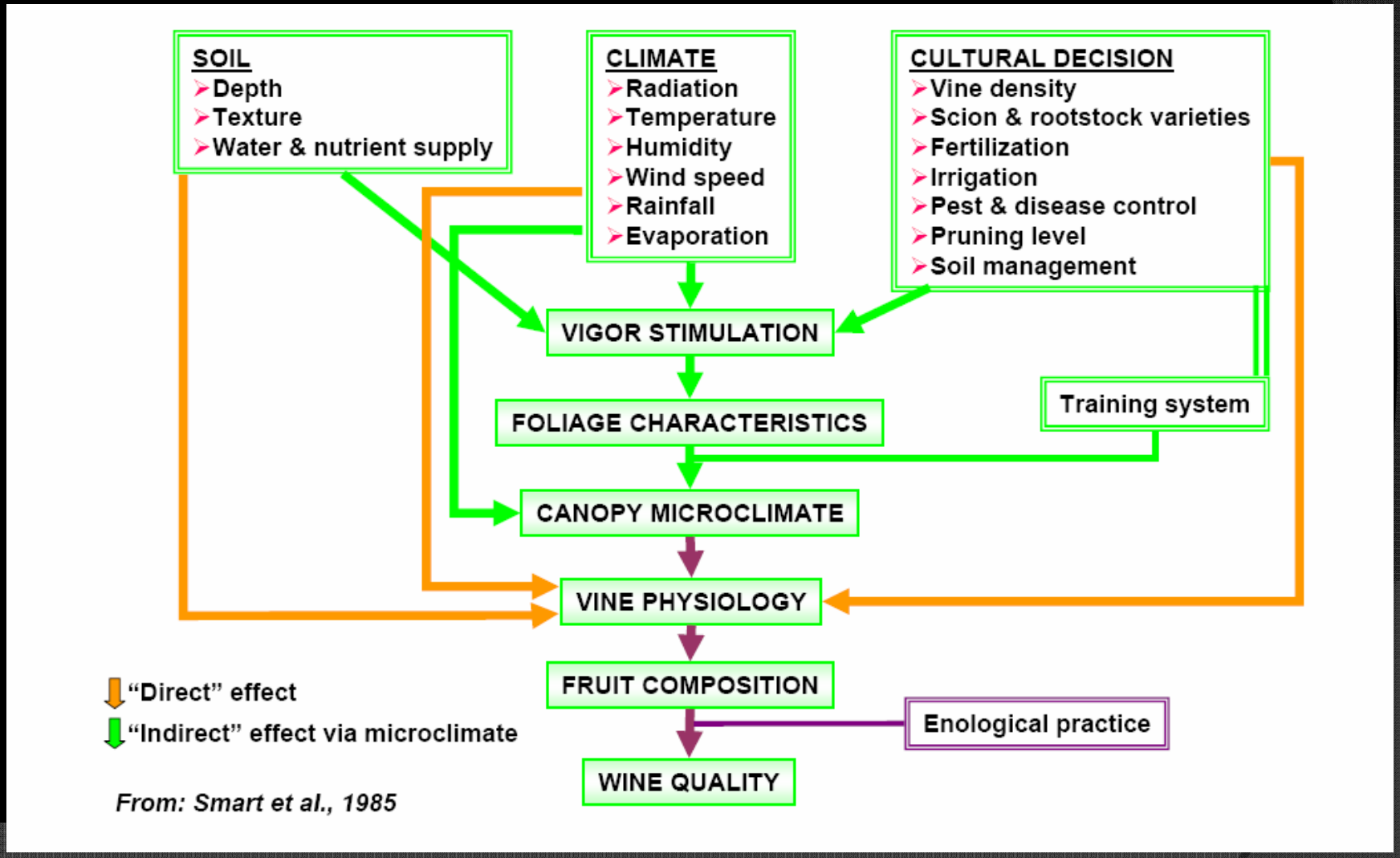
# Outline

- Factors affecting wine quality
- Overview of Phenolics
- Viticulture and enological treatment groups and methods
- Data
- Conclusions

# Some key factors in high quality wines

- Site selection
- Proper choice in cultivar and training system for your site
- Vinification practices
- Cultural practices
  - Canopy Management

# Indirect and direct effects of soil, climate, and viticulture practices on wine quality



# Canopy Management

- 5 major steps
  - Shoot thinning
    - 8”-10”
  - Shoot positioning
    - When tendrils are touch sensitive
  - Cluster thinning
    - 3-5mm in size
  - Shoot hedging and skirting
  - Leaf pulling
- Affects grape and wine quality
- Affects wine phenolics

# Importance of phenolics

- In the vine
  - Protection from UV radiation
  - Pigmentation
  - Antifungal properties
- In the wine
  - Color
  - Mouthfeel – bitterness (seed), astringency (skin)
  - Wine preservative
  - Contributes to browning

# Influences on Phenolic Development in the vineyard

- High Phenolics
  - High sun exposure
  - Lower N levels
  - Low soil moisture
  - Moderate canopy size
  - Moderate crop load
  - Low soil fertility

Jackson and Lombard, 1993

# Influences of Phenolic Development in the Vineyard

- Low Phenolics
  - Shading
  - High soil moisture
  - Excessive vegetation
  - High crop load
  - High soil fertility

Jackson and Lombard, 1993

# Phenolic Classes

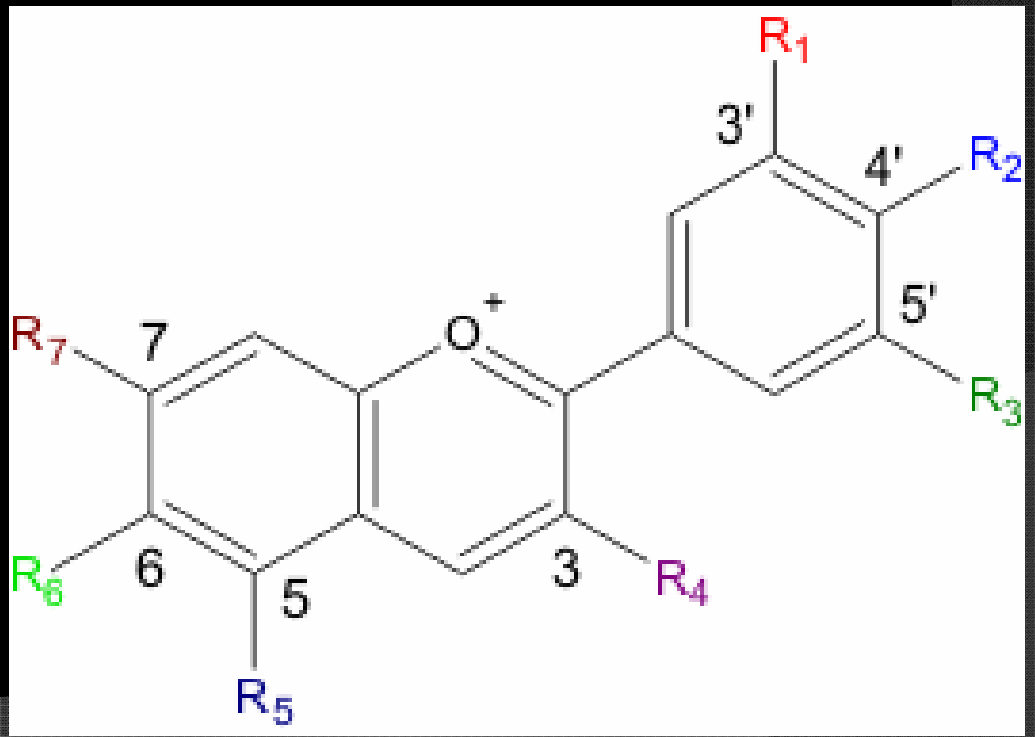
- Two Main groups of phenolics
  - Non-Flavonoids
    - Hydroxycinnamic acids
    - Benzoic acids
    - Hydrolyzable tannins
    - Stilbenes
  - Flavonoids
    - Flavan-3-ols
    - Flavonols
    - Anthocyanin

# Non-Flavonoids

- Hydoxycinnamtes
  - Major class of phenols in white wine
  - First to oxidize
  - Only found in the pulp
- Benzoic acids
  - Appear after a few months
- Hydrolyzable tannins
  - Only from oak
- Stilbenes - resveratrol

# Flavonoids

- Major component of red wines
  - Derived from the skins and seeds of grapes during the fermentation process



# Location of phenols

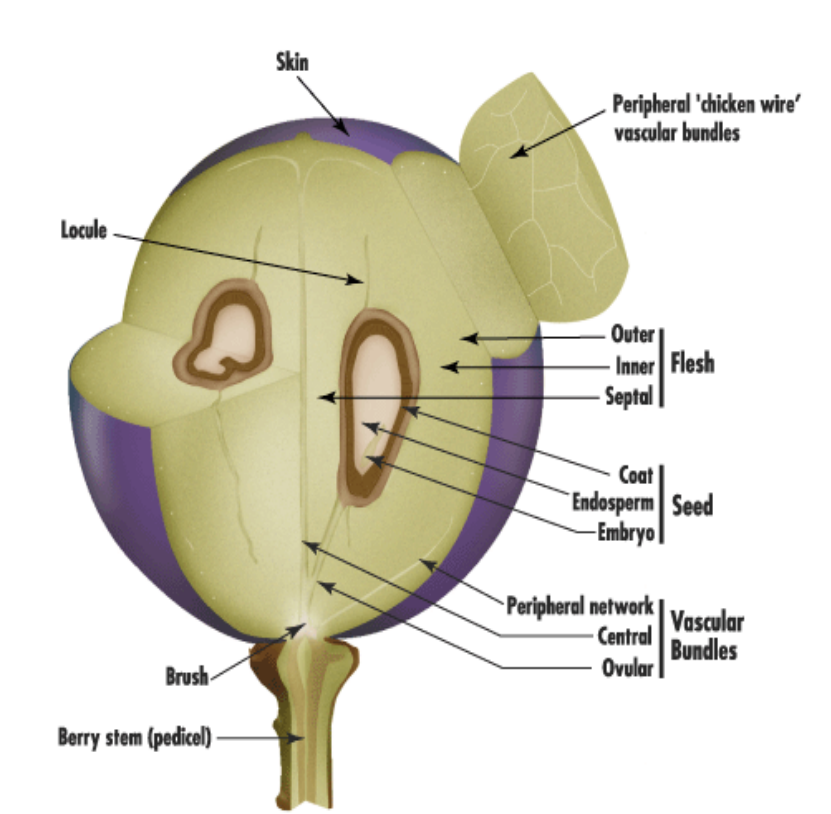



Figure I: Structure of a ripe grape berry partially sectioned on the long and central axis to show internal parts. Illustration by Jordan Koutroumanidis, Winetitles.

- Skin ~12-50%
  - Anthocyanins
  - Tannins
  - Flavonols
- Stems ~ 22%
- seeds ~ 46-69%
  - Tannins
- Pulp ~ 1%
  - Hydroxycinamminc
  - Hydroxybenzoic acids

# Viticulture Treatments

3 balanced pruning treatments x 3 cluster thinning treatments

**Balanced pruning treatments**

- 20 +10 (20 nodes retained for each 454g)
- 30 +10
- 40+10

**Cluster thinning treatments**

- 1 cluster per shoot
- 2 clusters per shoot
- 2+ clusters per shoot (no thinning)

# Enological Treatments

- Clusters harvested mid September and August
- 50ppm $SO_2$
- TSS adjusted to 21 TSS

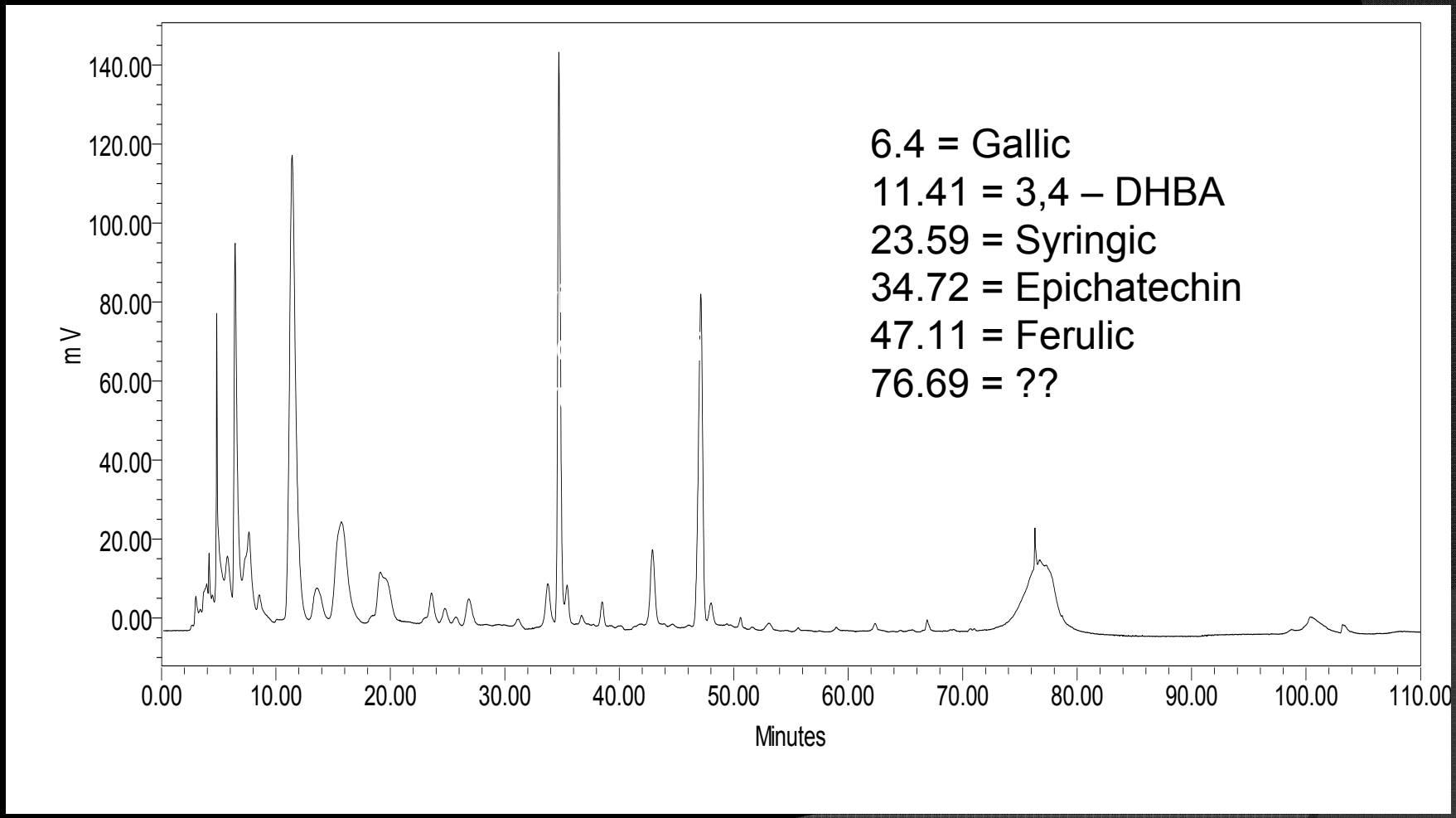
# Measuring via HPLC

- After fermentation
- Every two weeks until bottling
- 324 samples

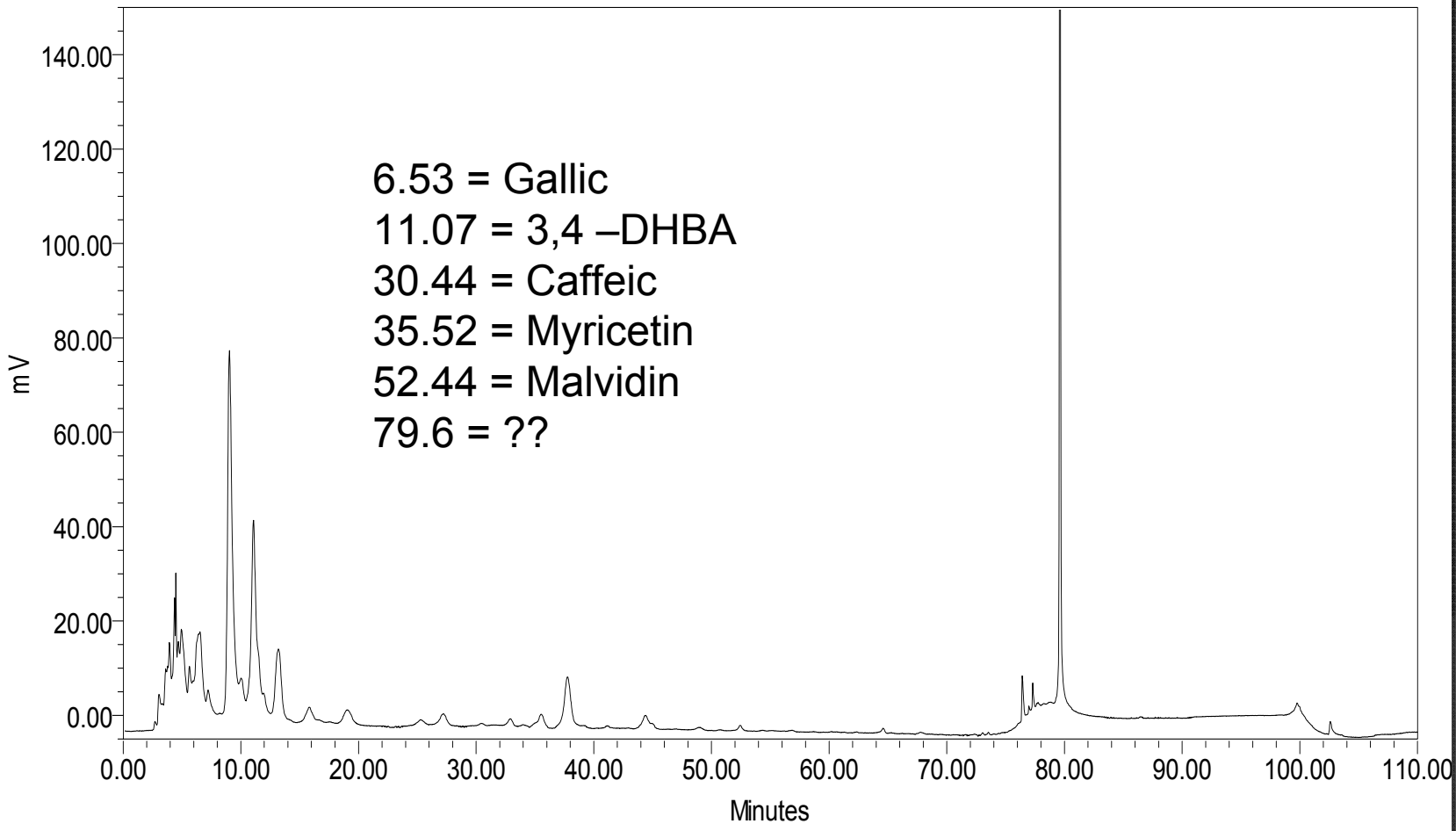
# Phenolic Retention Times

| Standard | Retention Time (min) |
|---|---|
| Gallic Acid | 6.47 |
| 3,4 - DHBA | 11.09 |
| Syringic acid | 23.41 |
| Caffeic acid | 28.89-30.68 |
| Epicatechin | 34.27 |
| Myricetin | 35.46 |
| Coumaric | 41.46 |
| Ferulic | 47.03 |
| Malvidin | 52.24 |
| Rutin | 54.03 |
| Resveratrol | 63.79 |
| Quercetin | 68.99 |

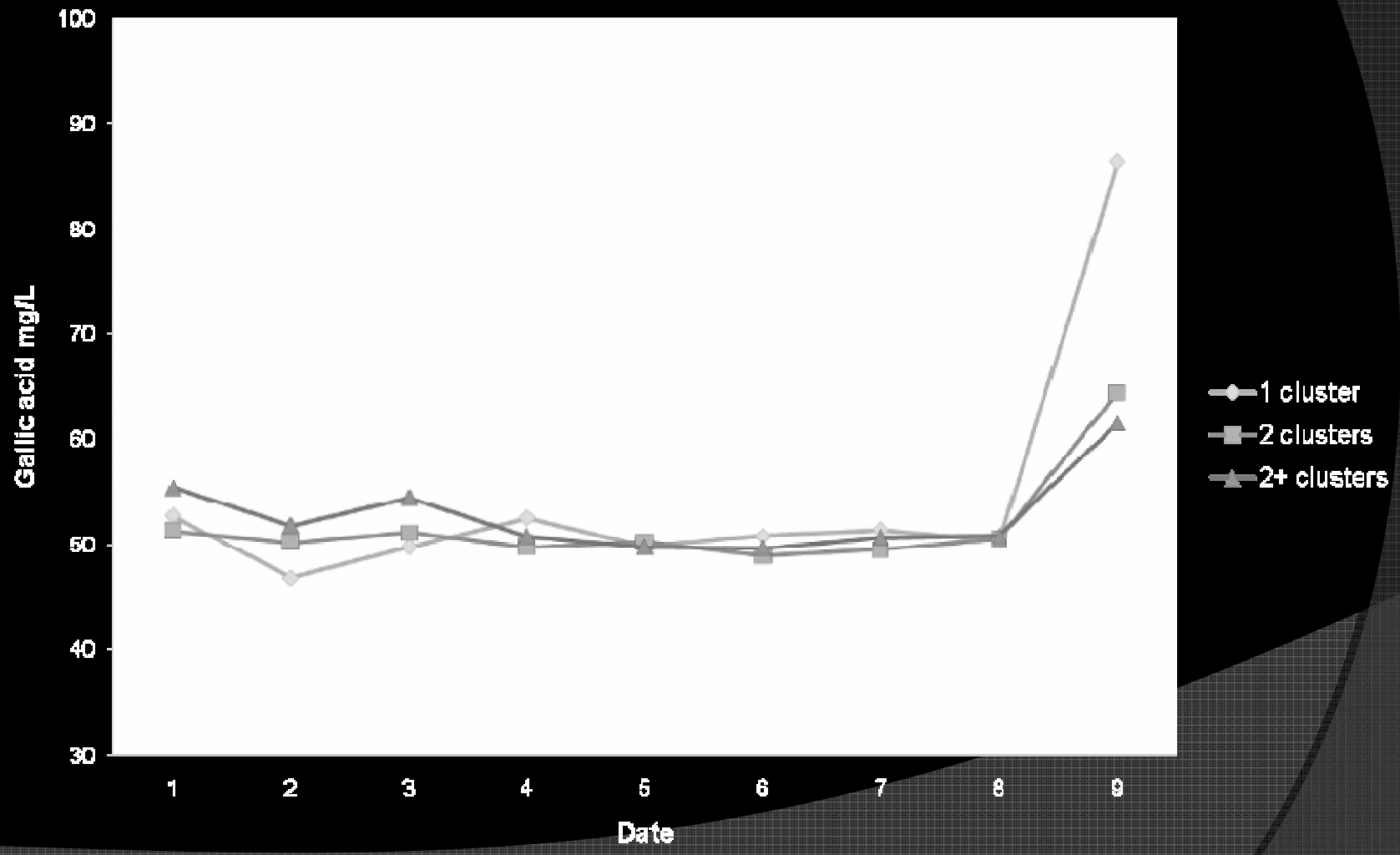
# HPLC analysis: Treatment 1 (20+10) x (1 cluster/shoot)



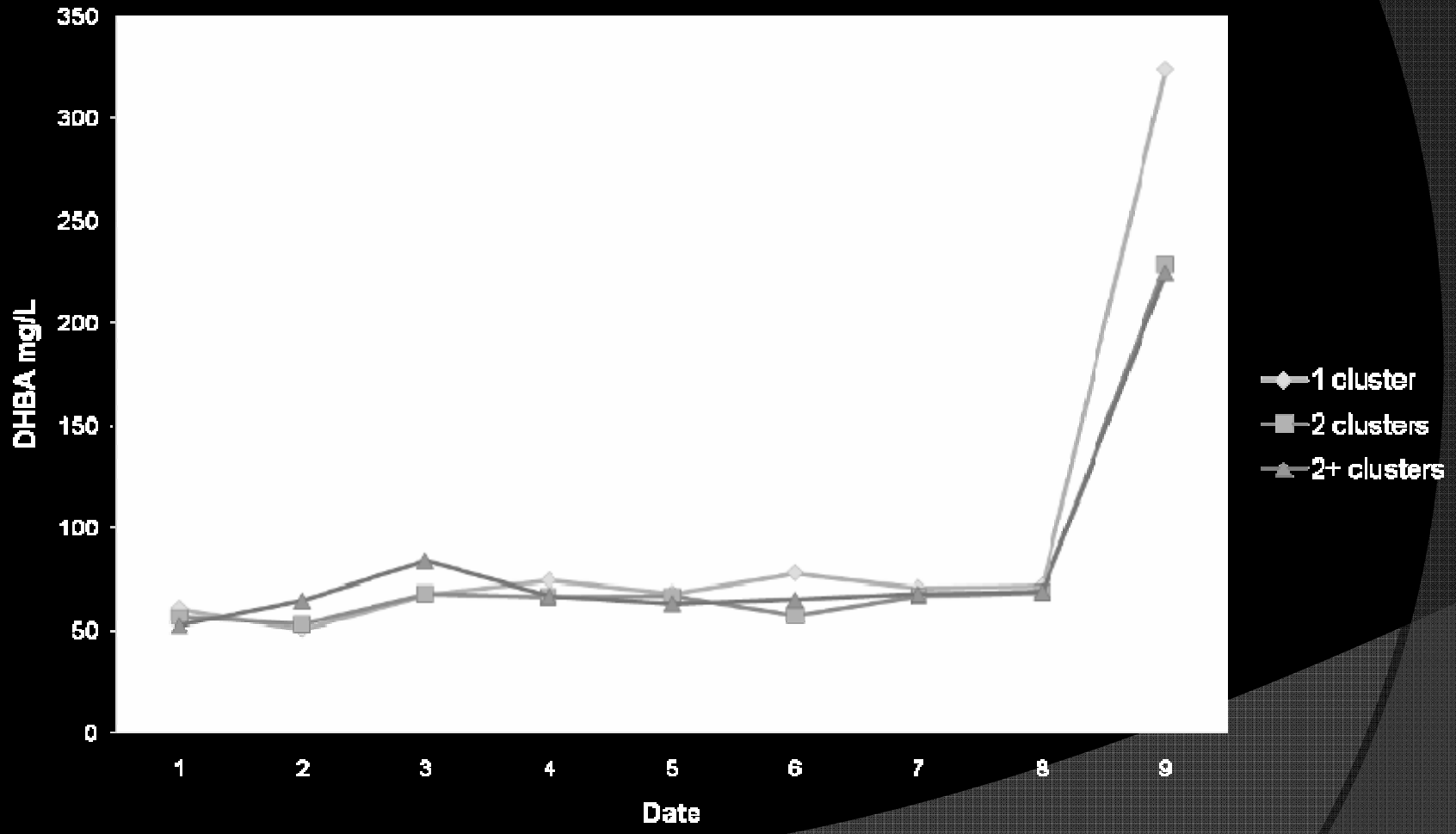
# HPLC analysis: Treatment 8 (40+10) x (2 cluster/shoot)



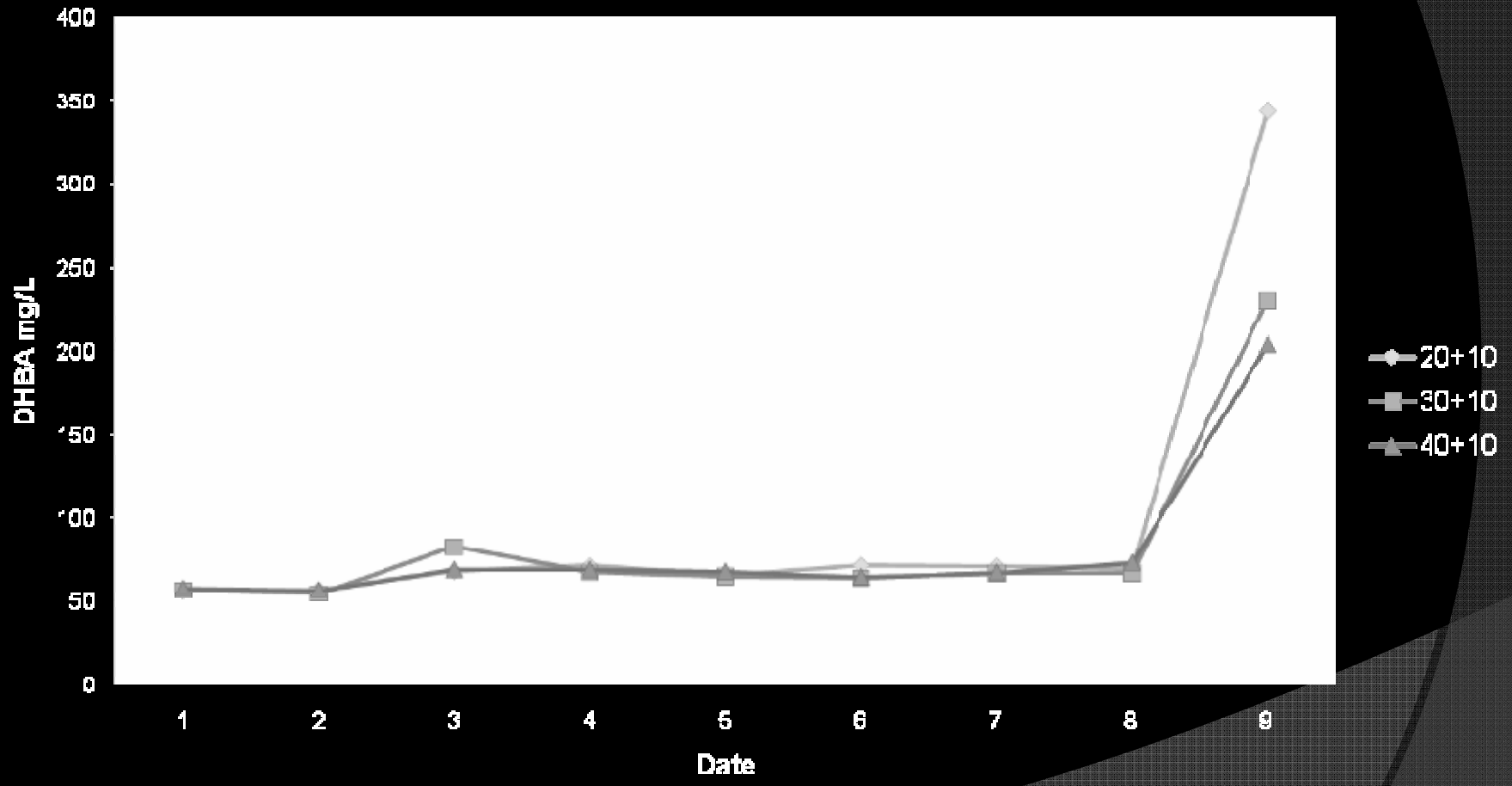
# Interaction of cluster thinning and sampling date on gallic acid



# Interaction of cluster thinning and sampling date on DHBA



# Interaction of Pruning Formulaand sampling date on DHBA



# Conclusions

- Increasing the severity of cluster thinning affected levels of both DHBA and gallic acid.
- Increasing the severity of pruning affected levels of gallic acid.

# Sensory Analysis:

Future studies:
Volatile quantification


Questions?