Filter Practices that Protect Aroma Profile

Increasing Colour and Stability of Pinot Noir

Aspects of Grape and Oenology Technology on Aromatic Whites

Sparkling Blanc de Noir Production

Dr. Ilona Schneider

Powering Business Worldwide

Comparison of different sparkling wines

parameter	Sparkling wine (Schaumwein)	Sekt	Sekt b.A.	Sparkling Wine winery Winzersekt	Crémant
Sugar concentration	45 °Oe 9,3 Bx	44 °Oe 9,0 Bx	54°Oe 11,1 Bx	54°Oe 11,1 Bx	54°Oe 11,1 Bx
Min. alcohol	9,5 % vol.	10 % vol.	10 % vol.	10 % vol.	10 % vol.
Total SO_2	235 mg/l	185 mg/l	185 mg/l	185 mg/l	150 mg/l
Bottle fermentation	X	X	X	X	X
Tank-bottle fermentation	X	X	X		
Tank fermentation	X				

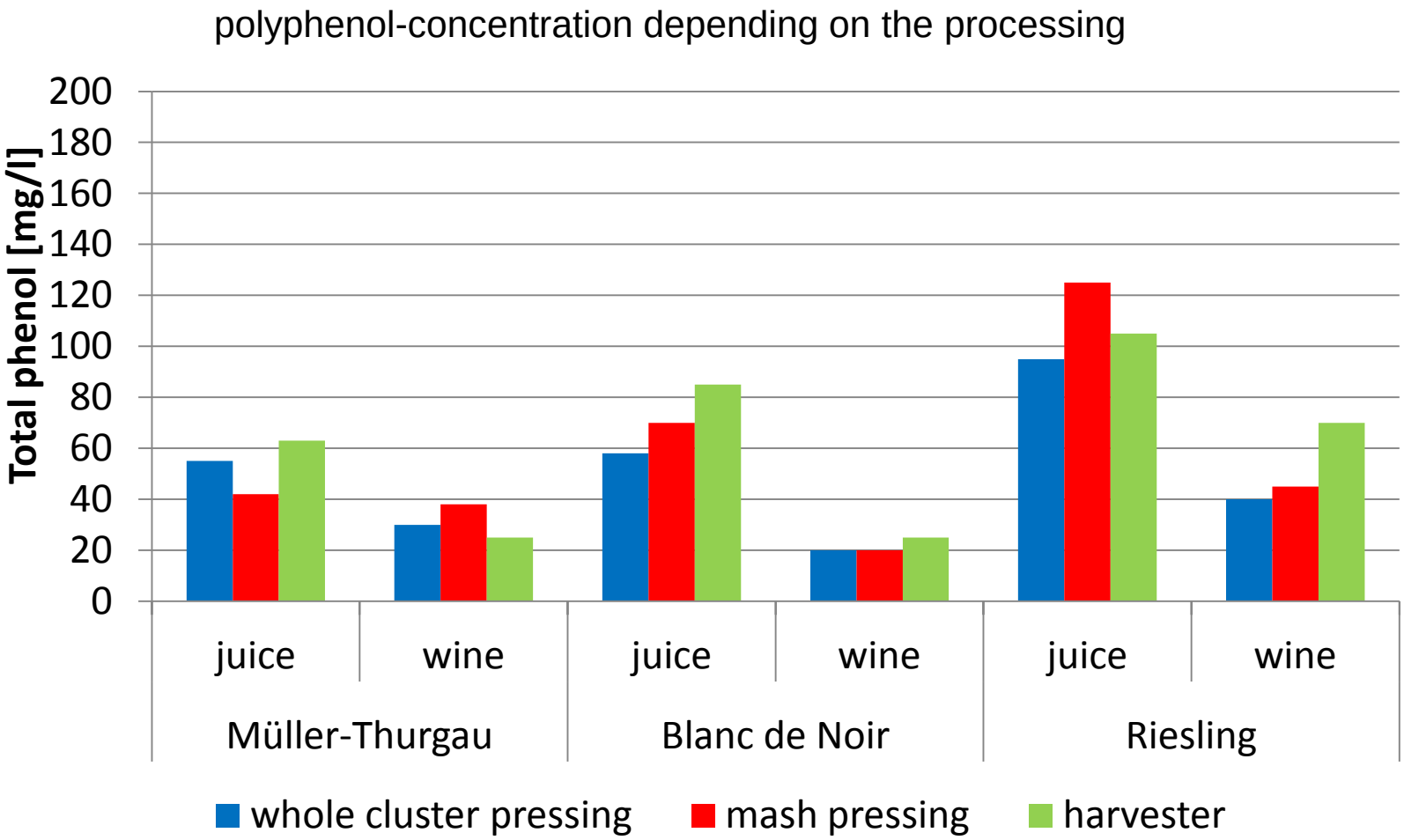
Base wine production – important facts

- grapes:
  - Ripe, healthy fruit
  - No botrytis infected grapes
  - No „Pernospora“– or powdery mildew - grapes
  - No grapes out of vineyards with low nitrogen management, high yield, vineyard with low water capacity

- mash treatment: with traminer and muscat – grape varieties
  - Other grape varieties: should not have any mash treatment
  - Destemming of grapes
  - Or whole grape cluster pressing

- Fractioning of pressing steps
  - Best: free running juice
  - max. 1. press fraction
    - Goal: polyphenol concentration < 200 mg/l

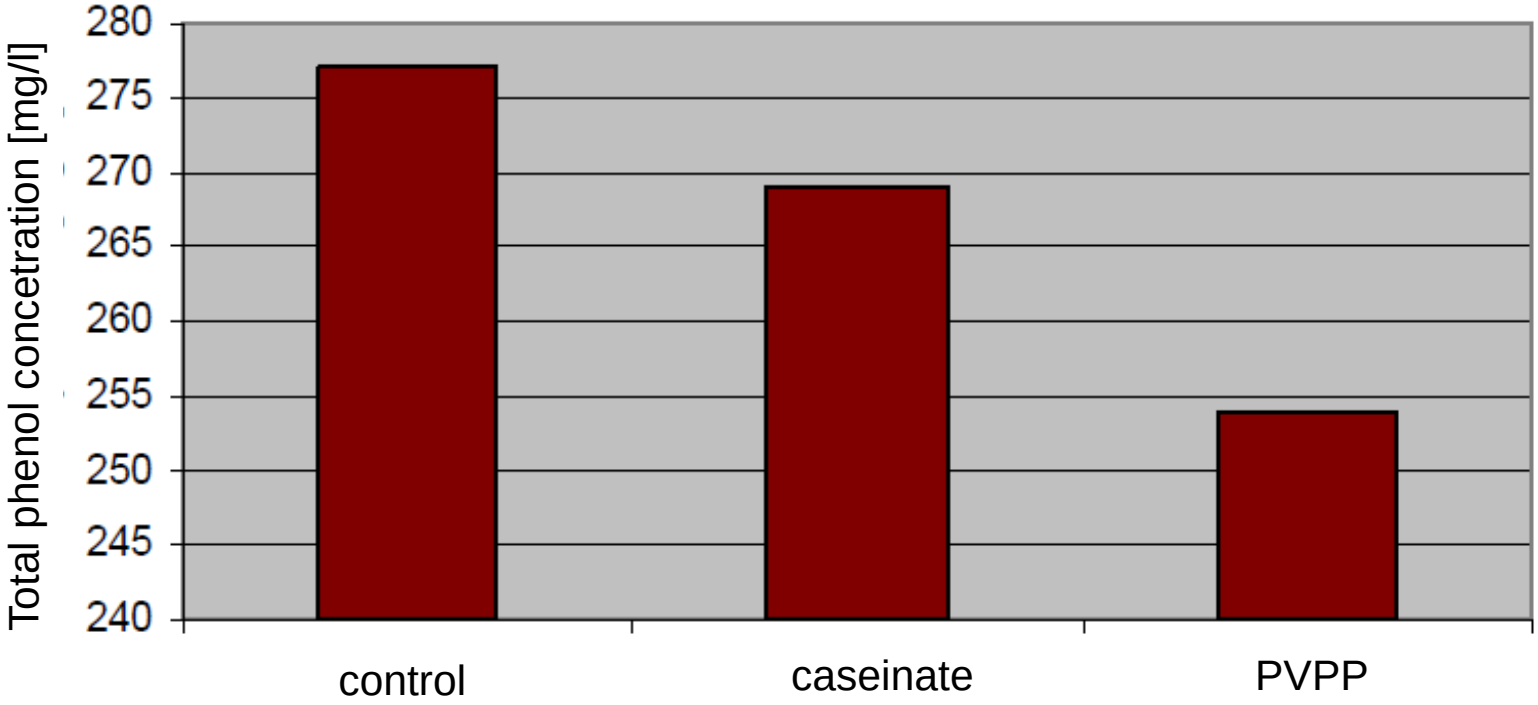
Base wine production – important fact´s



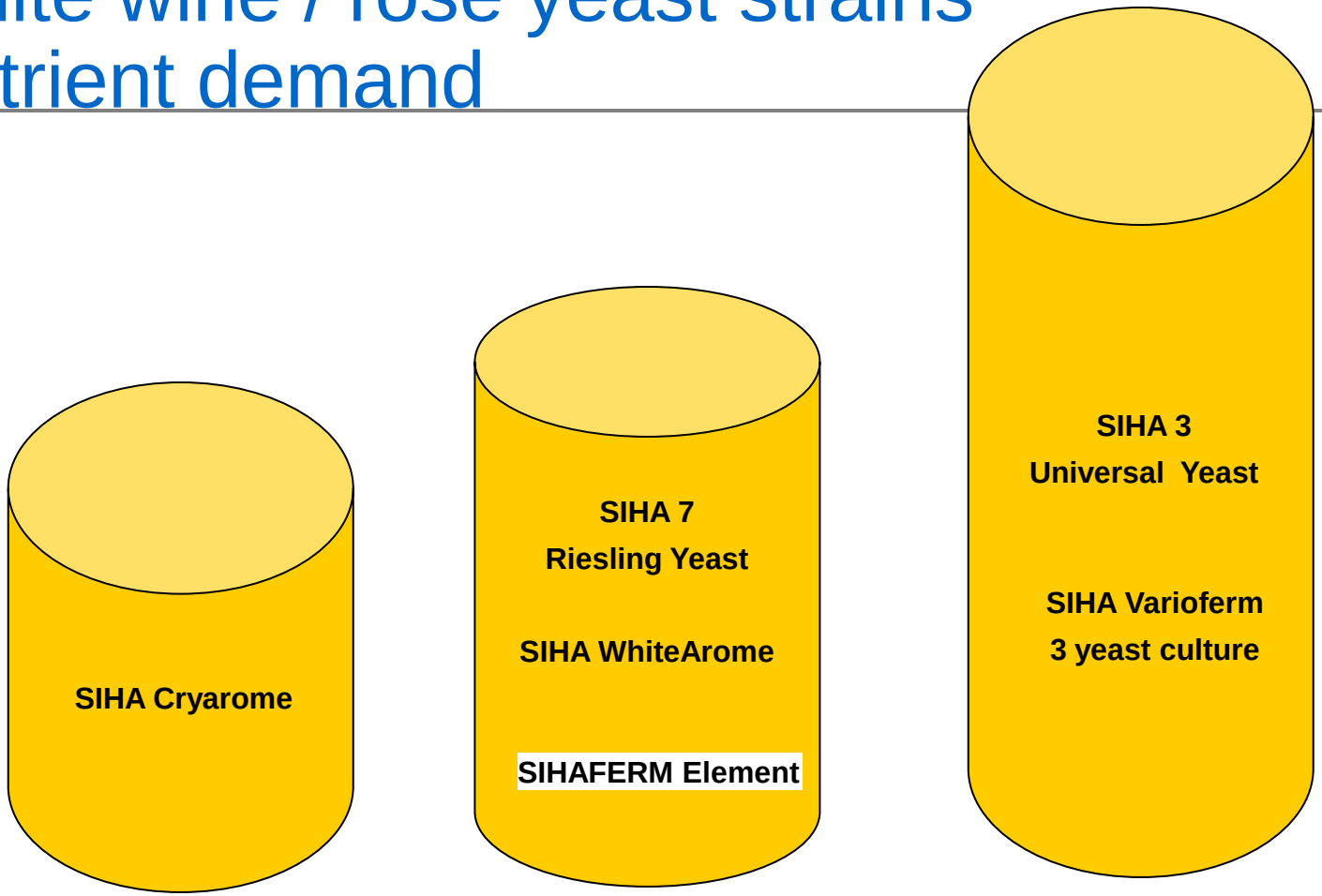
Base wine production – important fact´s

- Juic

after Folin-Ciocalteu (analysis for total phenol concentration)



white wine / rosé yeast strains nutrient demand



Low
Nutrient demand

Moderate
Nutrient demand

Low
Nutrient demand

Sparkling wine production

- Malolactic fermentation:

lic fermen

n – MLF

tion – afte

ation

Before fermentation

juice:

MLF

4-5 d waiting afterwards addition of yeast

MLF first

AF after

Before fermentation

simultaneous

Juice:

MLF

+ yeast

Simultanously or 2h after yeast addition

Fermentation and MLF

Co-inocculation

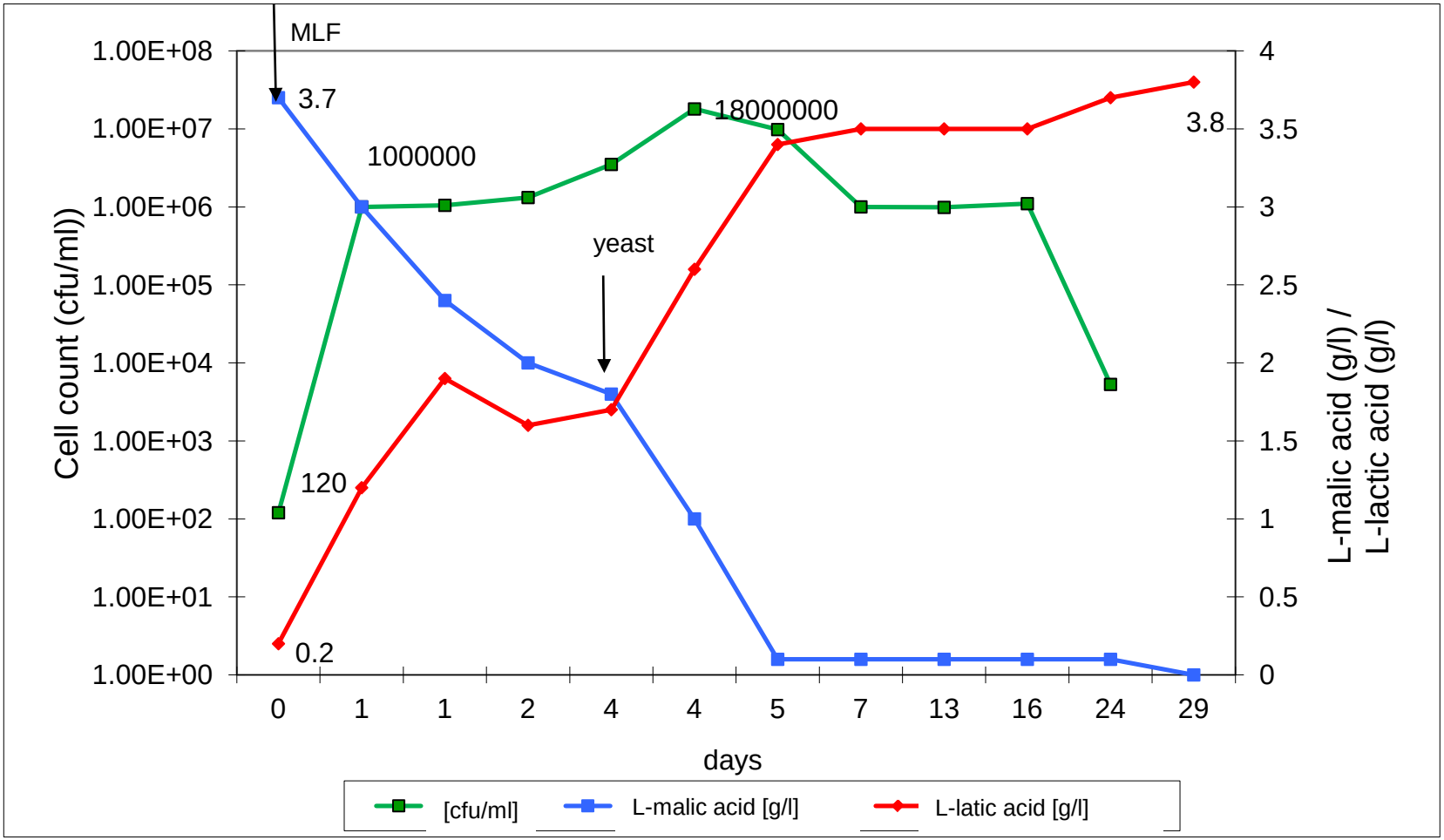
End/after alcoholic fermentation

End of alcoholic fermentation

MLF

Seq.- inocculation

Pinot Blanc - Cremant (T78)
malic acid: 3,7g/l (origin: 5,15 g/l), pH 3,42, SIHALACT. Oeno, active dry yeast after 4 days, volatile acidity: 0,10 g/l; free SO_2: <5 mg/l, total SO_2: 12 mg/l



Sparkling wine production

- MLF:
  - Before alcoholic fermentation:
    - High malic acid concentration > 4,0 g/l
    - pH important; 3,0 - 3,5
  - Co-inocculation:
    - Malic acid concentration 2,5-4,0 g/l
    - pH important: 3,0 - 3,5
  - Seq-inocculation after the alcoholic fermentaion
    - pH > 3,5 - residual sugar concentration < 10 g/l
    - MLF: SIHALACT. Oeno

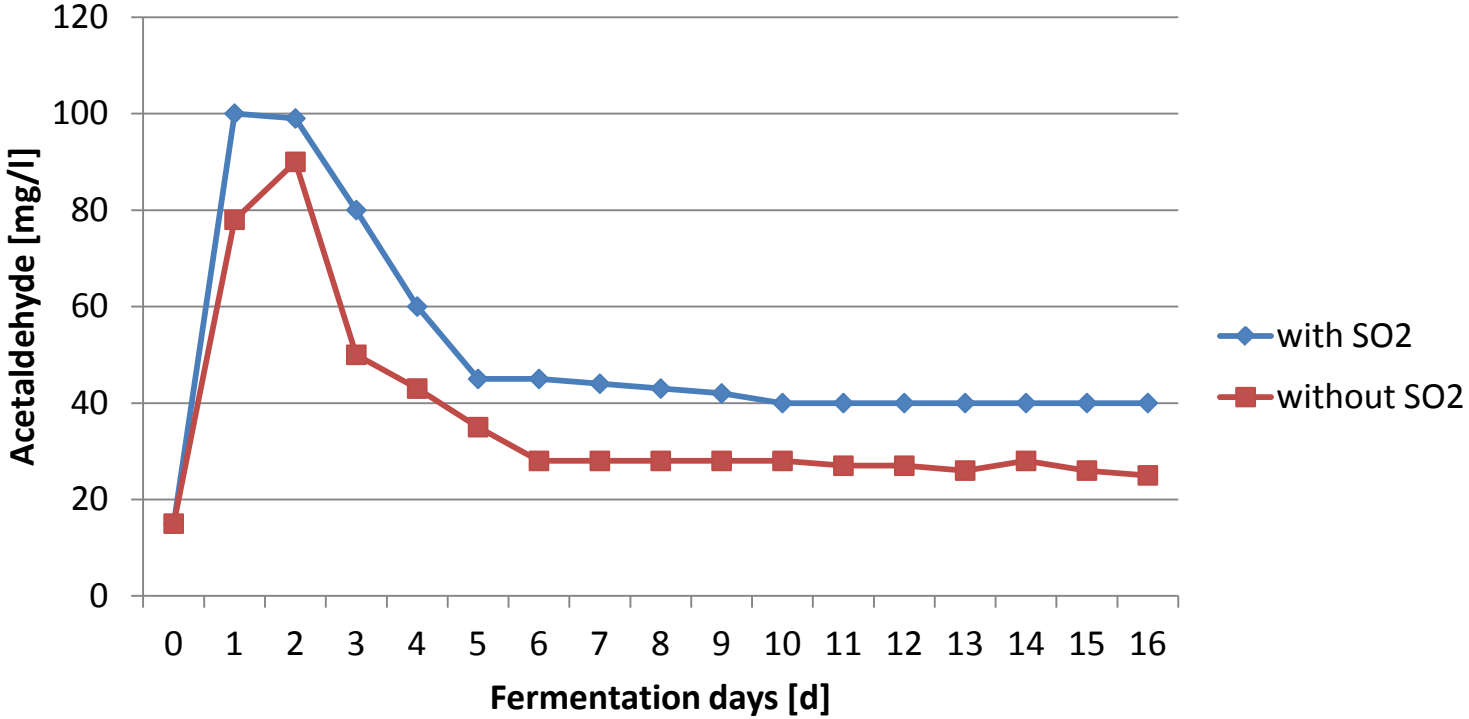
Sparkling wine production

- SO_2- level:

  Acetyladehyde –Production:

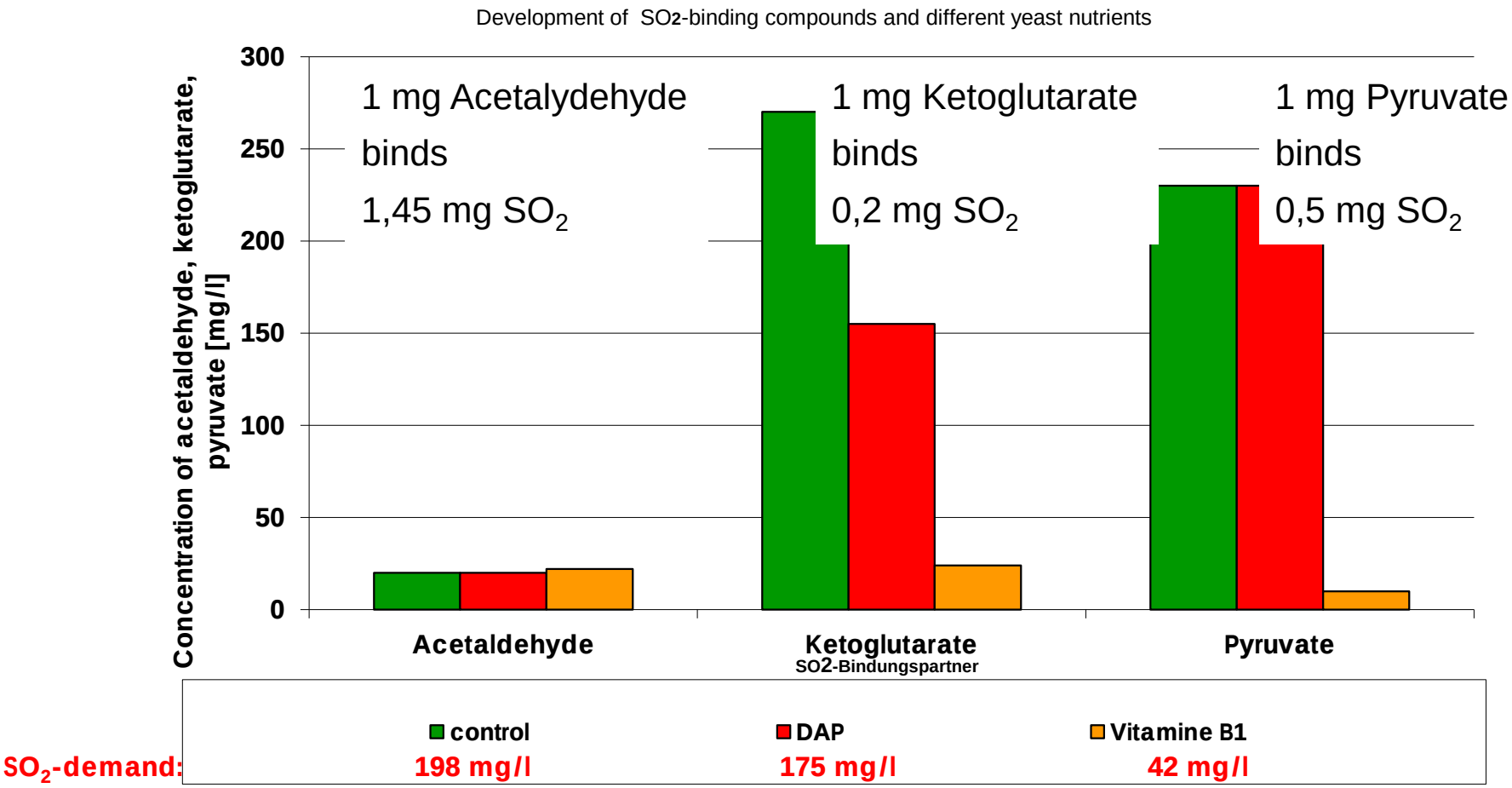
- Grape	→ mouldy grapes	→ SO_2 – addition ↑, gluconic acid ↑
- Yeast strain	→ active dry yeast	→ SO_2 – addition →
	→ spontaneous	→ SO_2 – addition ↑
- pH (3,2 and 3,6)	→ pH 3,6	→ SO_2 – addition ↑
- nutrients (no/250 mg/l)	→ high concentation	→ SO_2 – addition ↓
- Fermentation (12°C/20°C)	→ 12°C	→ SO_2 – addition ↑

Acetyldehyde Production during alcoholic fermentation



- Conclusion: 50 mg/l SO_2 in juice cause 15 - 37,5 mg/l more total SO_2

Development of SO_2-binding compounds – Influence of yeast nutrients



Sparkling wine:	effect
grapes Healthy, ripe grapes	↓ Reduction of mouldy aromas
mash - Low pumping - Mashing of muscat varietals - Whole cluster pressing (only free running juice)	↓ Low polyphenol ↑ Aroma precursor protection
Juice – Total polyphenol concentration < 200mg/l – Juice clarification: **SIHAZYM Claro** (2 g/hl) at 10 °C – Juice finning: **SIHA GESIL** afterwards **SIHA Puranit** (low iron)	↑ Effective clarification ↓ Unripe note and protein stabilization
Fermentation – yeast nutrients – Addition of **SIHA PROFERM H+²** (40 g/hl) + partial addition after 1/3 of alcoholic fermentation of **SIHA Fermentation salt** (up to 60 g/hl)	↑ YAN
Fermentation & MLF – **SIHA Active dry yeast 7** Riesling yeast (20 – 25 g/hl) – **SIHA White Arome** (20 g/hl) – **SIHALACT. Oeno**	↑ grape-varietal aroma ↑ Fruity and aromatic wines ↑ Reduction of L-malic acid
End of fermentation (< 10 g/l residual sugar): - Fill up the tanks - if not co-inocculation→ seq. inocculation	↑ Reduction of SO_2 demand
wine – 1. racking & SO_2-Addítion: 50 mg/l, 20-30 mg/l free SO_2	↑ Stabilisation

Sparkling wine parameter – base wine

- Alcohol concentration: 88 g/l
- Residual sugar concentration: 0 g/l (< 2 g/l) – without sluggish fermentation
- Total acidity: 6 - 8 g/l (Blanc de Noir)
- Total phenol concentration: < 200 mg/l
- Total SO_2: 50 - 70 mg/l (< 80 mg/l)
- Free SO_2 : 15 - 20 mg/l (< 20 mg/l)
- Bentonite: stable
- Tartaric acid: stable
- Filtration: sterile

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History of wine stile

Sensorical variation

1960er — **Off flavor, residual sugar**
Botrytis — **„Nature wine“**

1970er

Juice clarification,
whole cluster pressing,

1980er — **Active dry yeast** — **„Design wine“**

1990er — **Cold fermentation**
Kaltgärung
Barrique

2000er

2010er — **Terroir, spontaneous fermentation** — **„authentical wine“**

Enology trends – view from europe

- Spontaneous alcoholic fermentation
- Favorite exotic aroma – „Thiole-Aficionados“
- Moderate alcohol
- Long yeast contact time
- Biotechnology (microorganismen, enzymes) instead of mechanical treatment
- Lower barriquenote in red- and white wine
- High volume barriques for white wines
- Wines from Amphore
- Production of individual signature wines

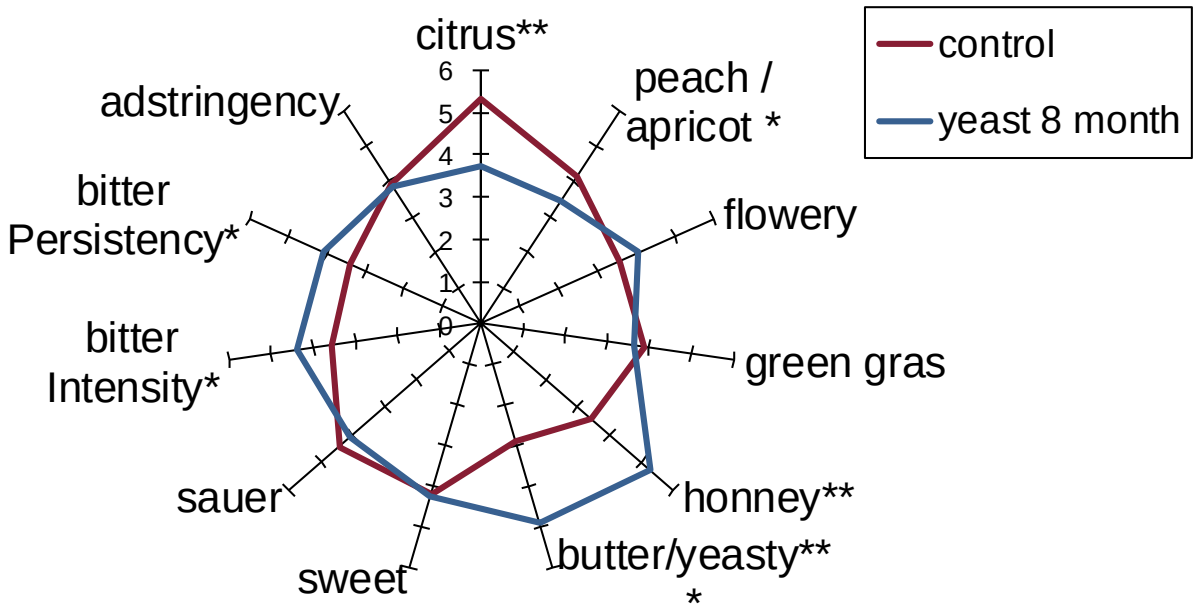
Trend: Wine style

- Easy-drinking: cold fermentation aroma – fresh- fruity
- Expression of green – exotic Sauvignon blanc
- minerale, structured Terroir wine
- Complex, creamy Sponti Type
- Intensive Bouquetwine
- Rosé – easy to drink Lifestyle
- Premium red wines without an overloading of tannins

Easy-drinking Cold fermentation – fresh - fruity

- Sugar concentration juice 70 – 80°Oe
- 7 – 9 g/L juice acidity
- Max. 10% Botrytis
- 30-50 mg/L SO_2, depending on pH
- Enzymation of juice, Bentonite finning
- Intensive juice clarification 10 – 30 NTU
- Yeast with high ester production (SIHA Cryarome, Siha WhiteArome, SIHAFERM Element)
- Fermentation at beginning 15°C, stop cooling process depending on the fermentation speed of the yeast
- High demand of yeast nutrient (DAP, SIHA SpeedFerm)
- SO_2-Addition 14 days after fermentation, no MLF, early racking.
- If residual sugar: stop fermentation of by cuve
- Early bottling: from nov. until spring

Sensorical profile of long yeast sediment storage in 2009
Pinot Blanc (N = 16 person x 3 reputation)



significance:
p <0,05; **p<0,01; ***p<0,001

M. Sokolowsky, U. Fischer

AiF FV 16006

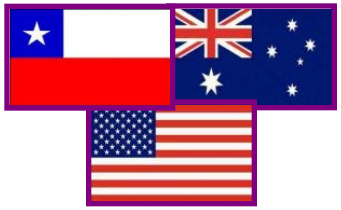
International style of Sauvignon blanc (Fischer, Weinwelt 2011)

Green note

South africa

New sealand

France

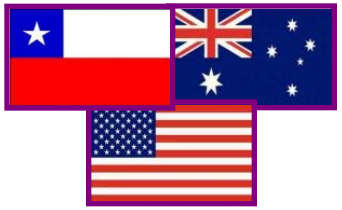


Chile, US, Austr.

Rasberry

South africa

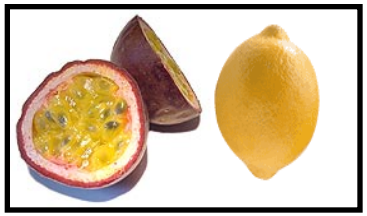
New seeland



Chile, USA, Austr.

France

Fruit (passionfruit, citrus)



Minerale

Expression of green – exotic Sauvignon blanc

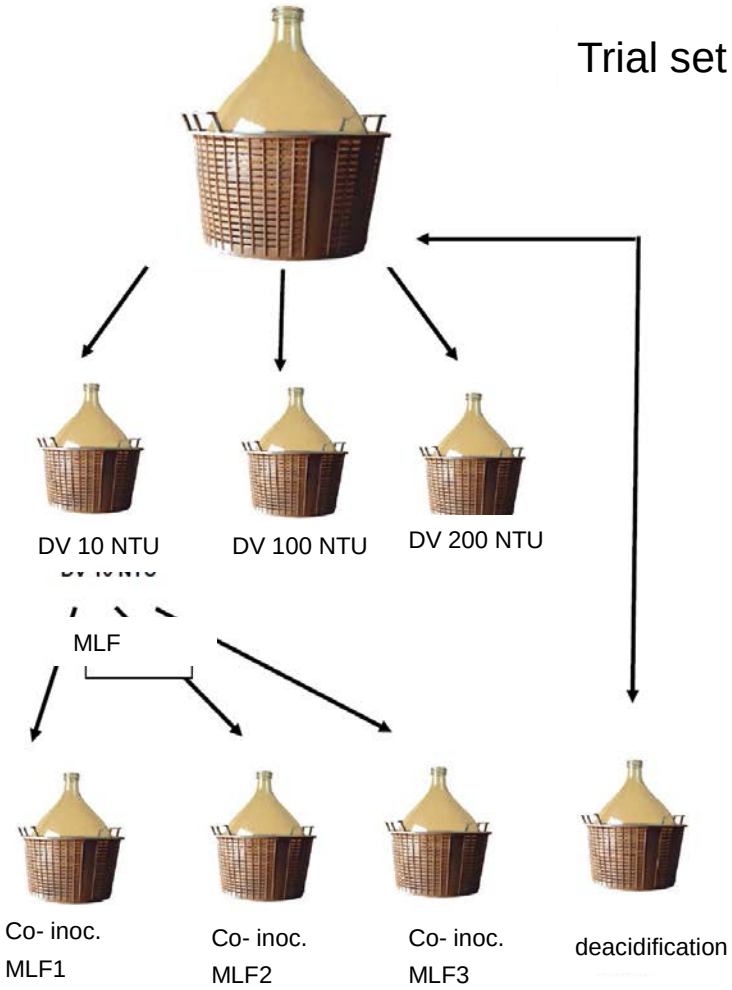
- Juice sugar concentration 80 – 90°Oe
- 7 – 10 g/L juice acdity
- No botrytis
- 1/3 early harvest (Pyrazine) 2/3 late harvest (Exotic)
- 50 mg/L SO_2 + 100 mg/L ascorbic acid
- Enzymation of juice, Bentonite finning
- Intensive juice clarification 10 – 30 NTU
- Sauvignon Blanc yeast (SIHA Cryarome)
- Fermentation at beginning 16-18°C, stop cooling process depending on the fermentation speed of the yeast
- SO_2 Addition 14 days after fermentation, no MLF, racking 14 Tage before bottling DE-Filtration
- No or low residual sugar
- O_2-reduction bottling from feb., screw caps

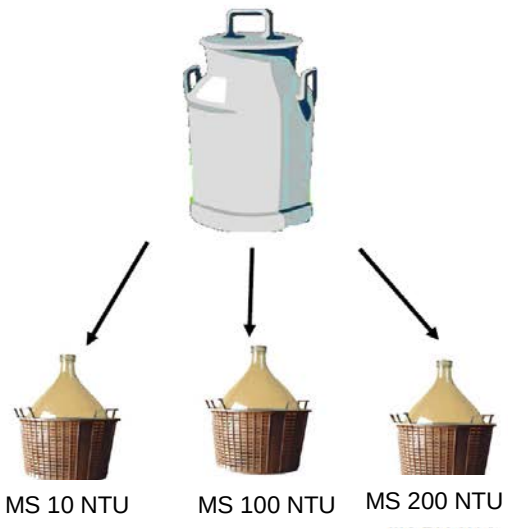
Trial 2010 Sauvignon Blanc

Direct processing (DV)

Mash treatment (MS)

Trial set up

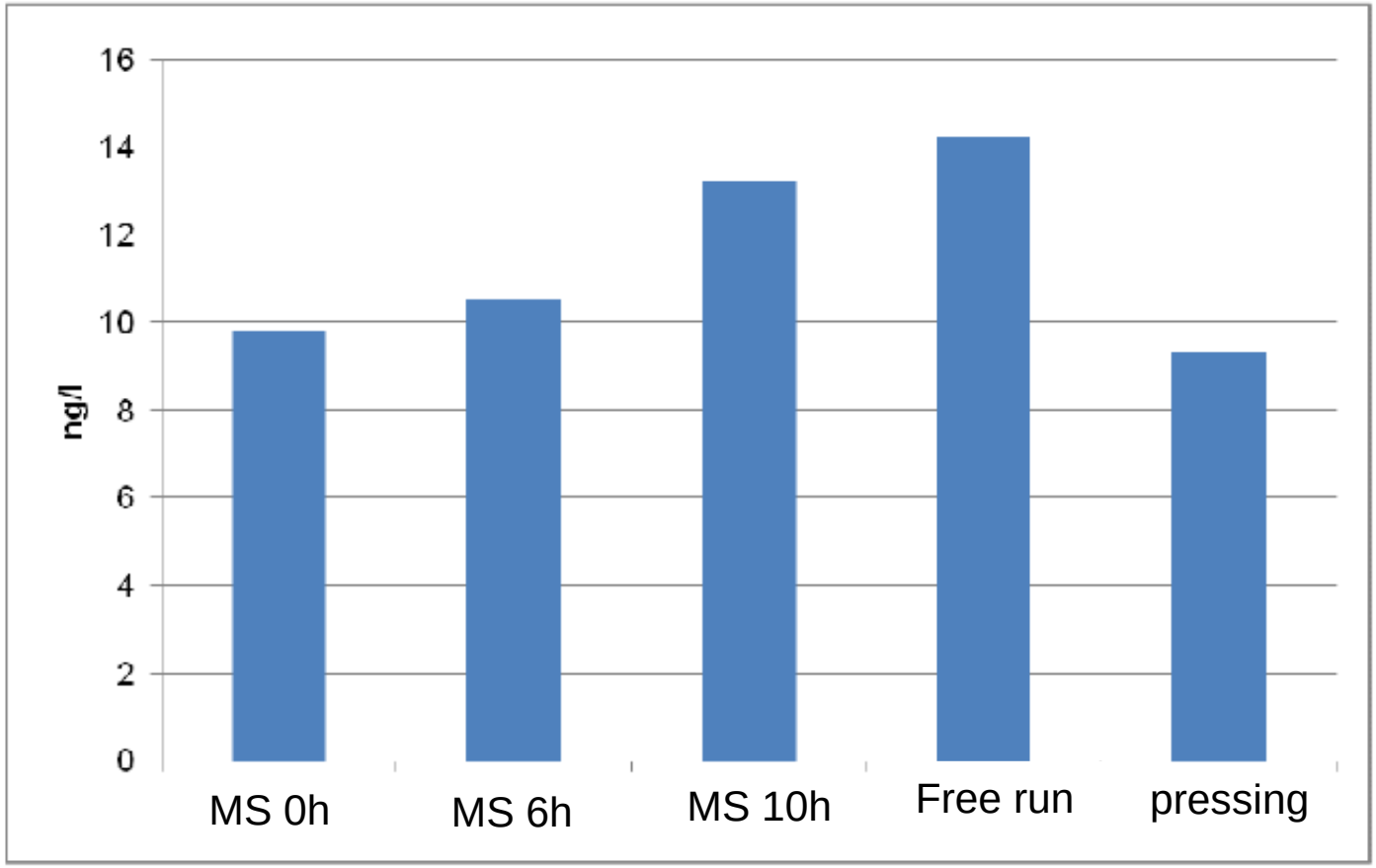




Bachelor M. Schneider
FH Rhein-Main, FB Geisenheim,

A Rosenberger, H.-G. Schmarr,
DLR Rheinpfalz

Extraction of Isobutyl-Methoxypyrazine during mash treatment and press fraction



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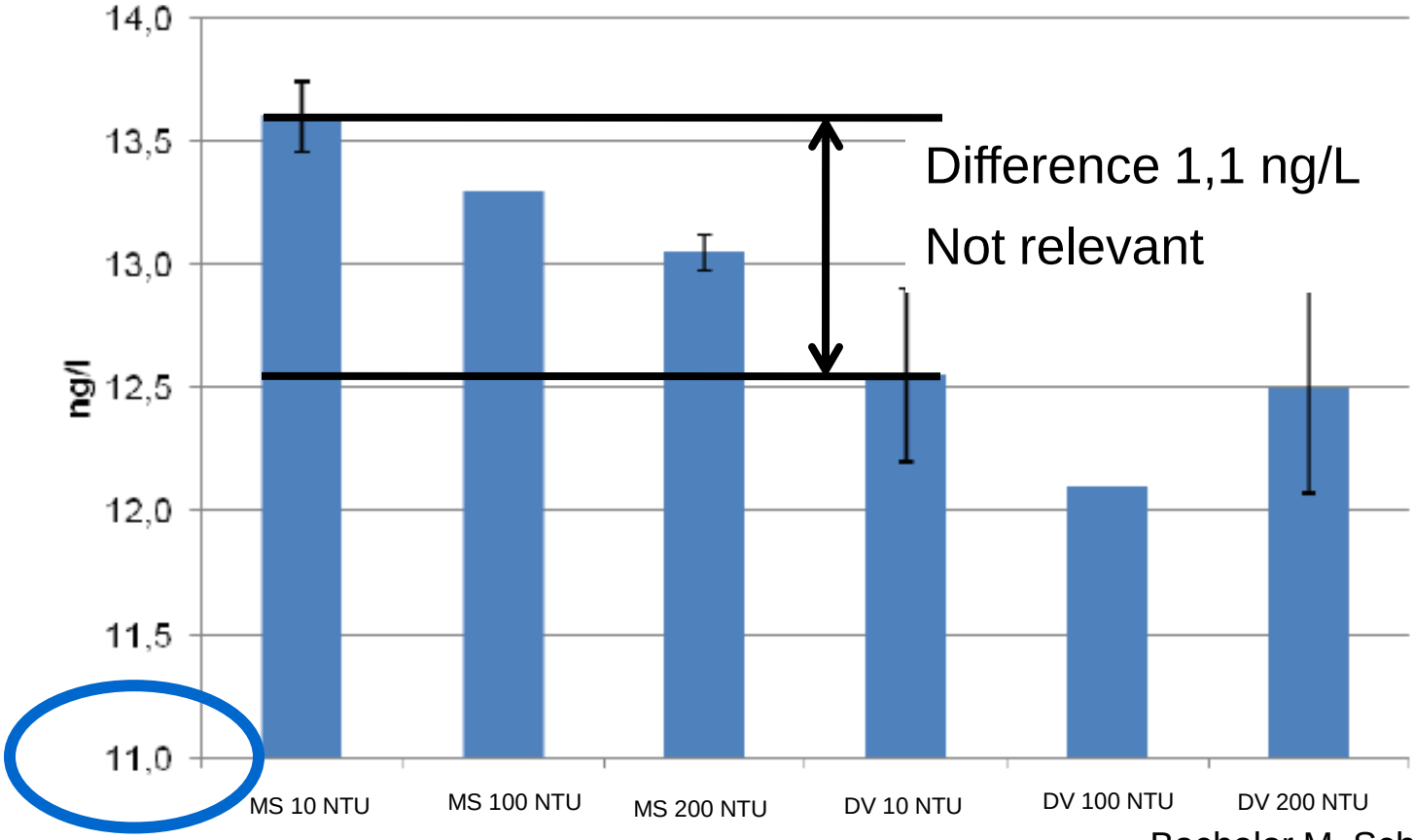
A Rosenberger, H.-G. Schmarr,
DLR Rheinpfalz

Isobutyl-Methoxypyrazine after bottling



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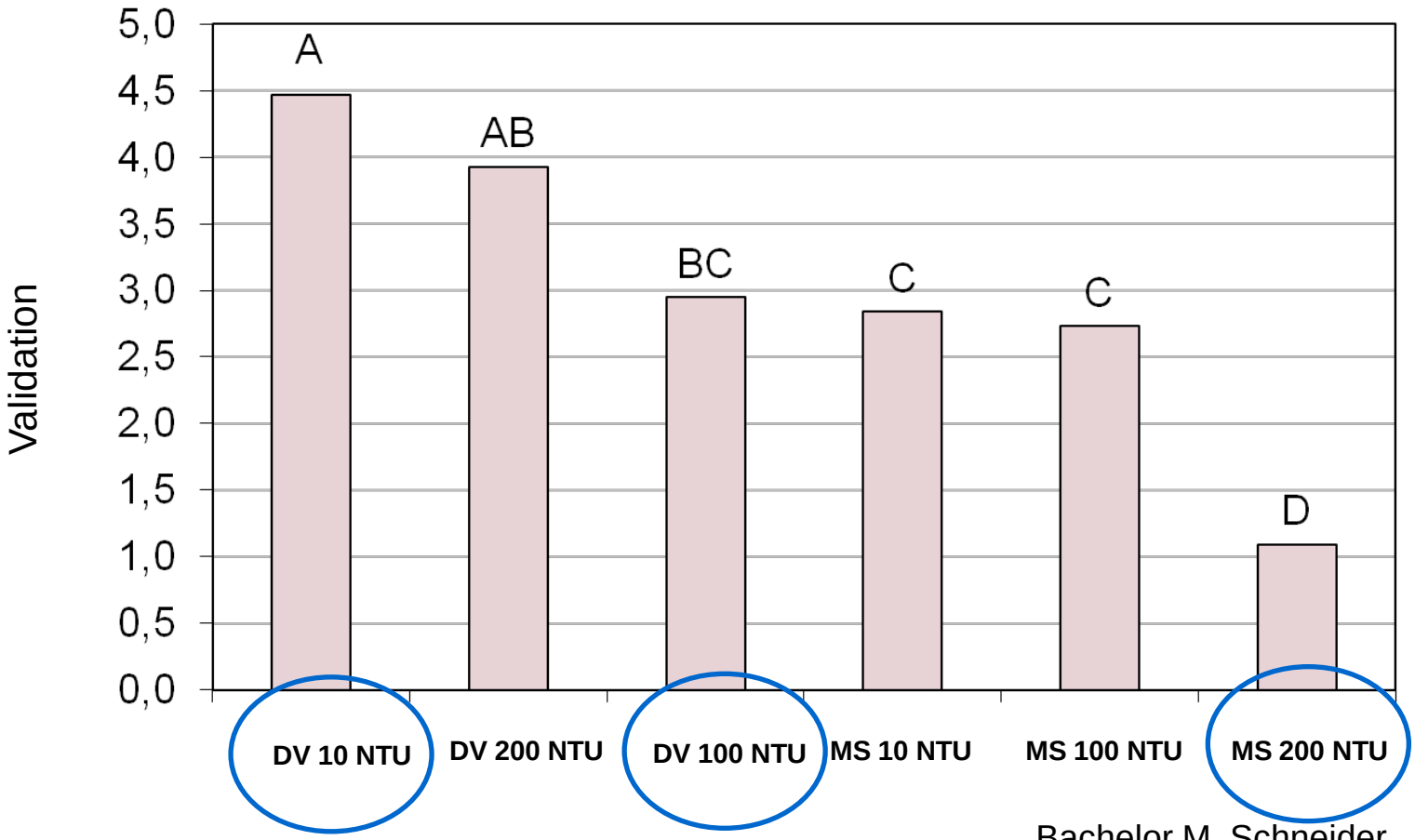
A Rosenberger, H.-G. Schmarr,
DLR Rheinpfalz

5-point-scheme (n= 16)



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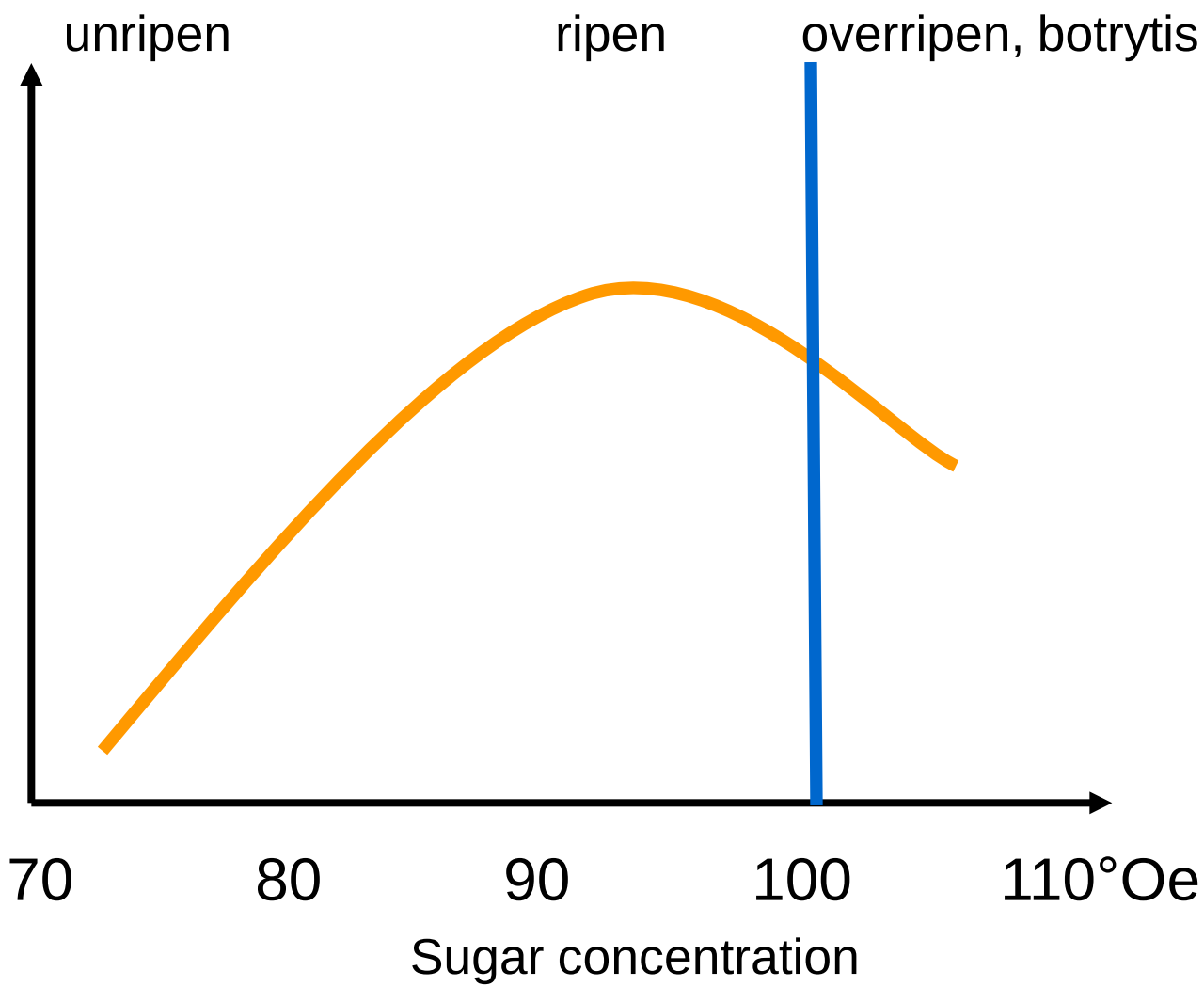
FH Rhein-Main, FB Geisenheim,

A Rosenberger, H.-G. Schmarr,
DLR Rheinpfalz

Optimale ripening of grapes

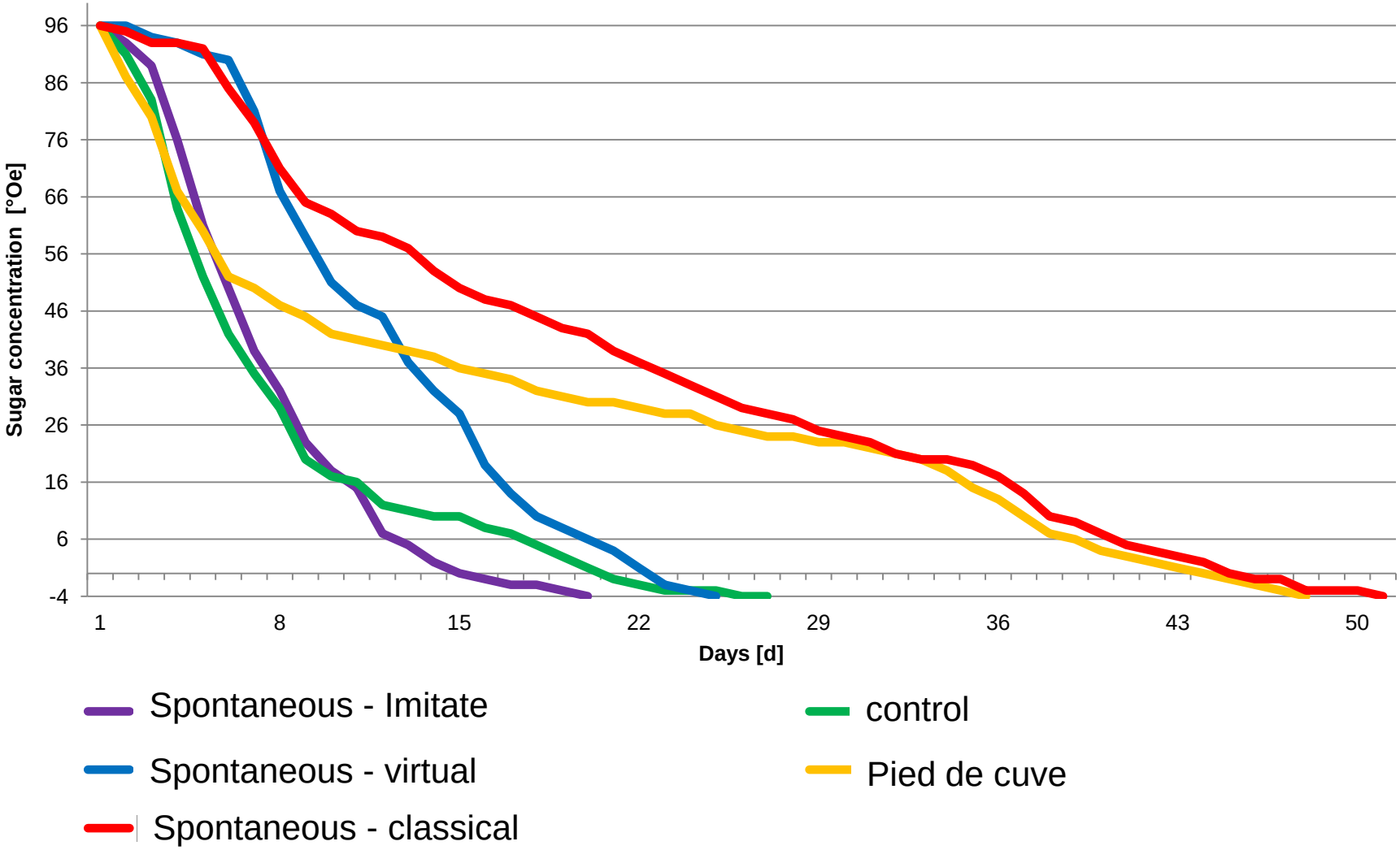
Terroir



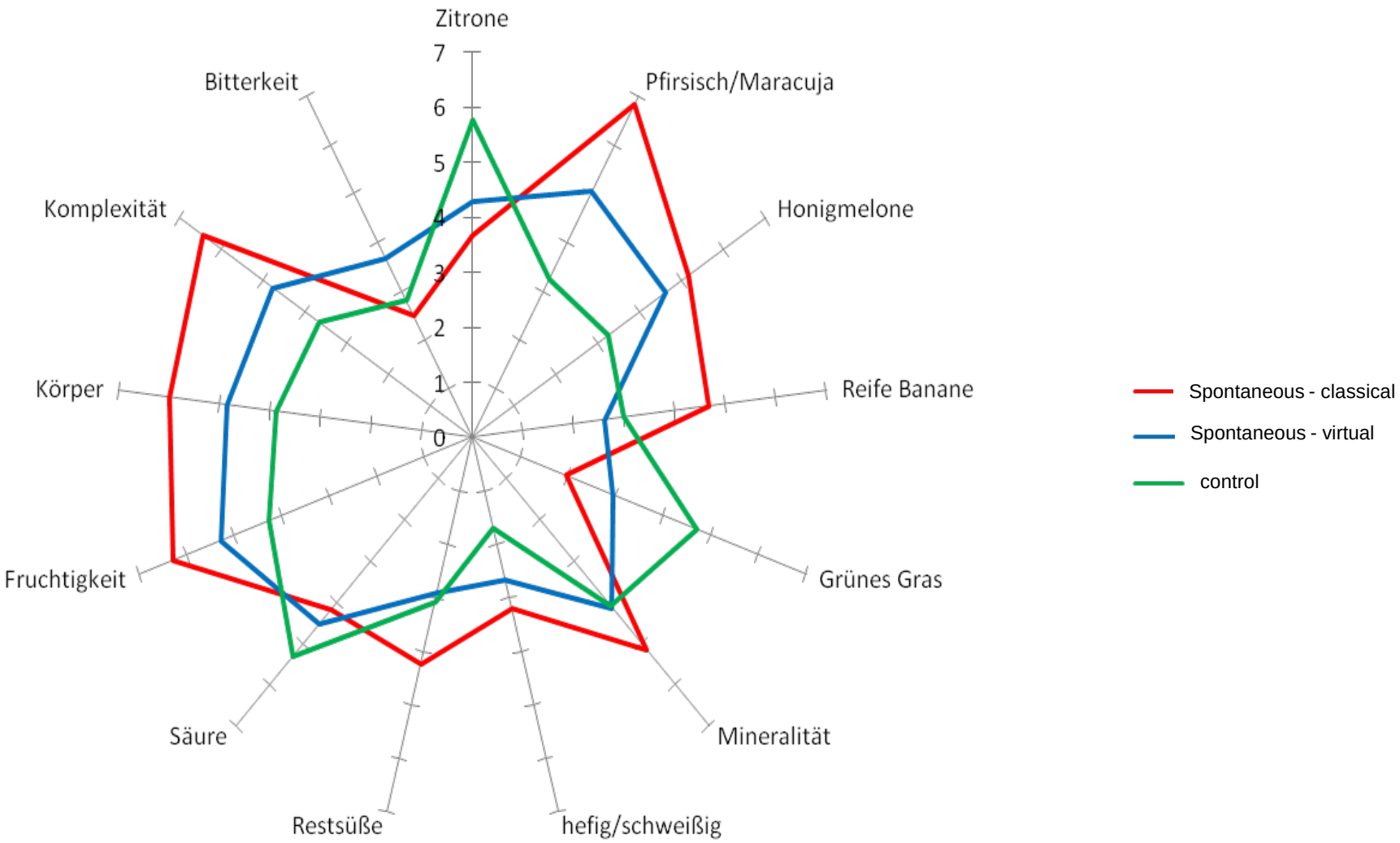
Complex, creamy Sponti Type

- Sugar concentration 85 – 105°Oe, 6 – 10 g/L juice acidity
- Max. fresh 10% botrytis
- mashing (4 – 12h) with enzyme
- Moderate juice clairification 40 - 100 NTU
- no SO_2 – spontaneous – fill up the tank
- Fermentation and storage in big wood barrels
- Wait until fermentation starts– Addition of nutrients like SIHA SpeedFerm, later SIHA Proferm Plus
- Fermentation temperature 20°C
- after ½ of fermentation addition of SIHAFERM Element
- SO_2-Addition14 days after fermentation, no MLF, racking 14 days before bottlingwith DE-Filtration
- Natural residual sugar
- Sufficient SO_2 for a long bottle storage

Fermentation rate



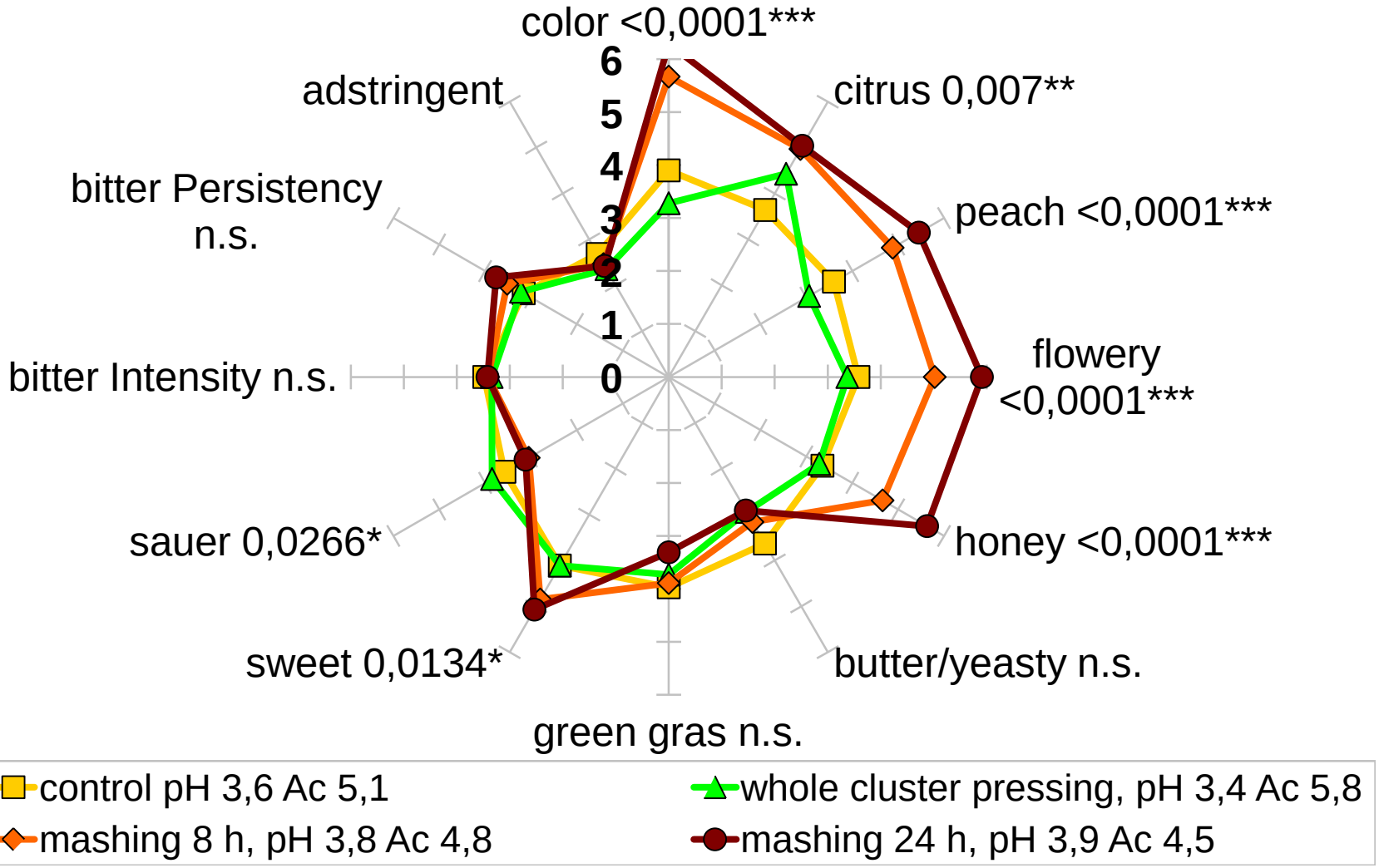
Descriptive analysis (N = 21 persons)



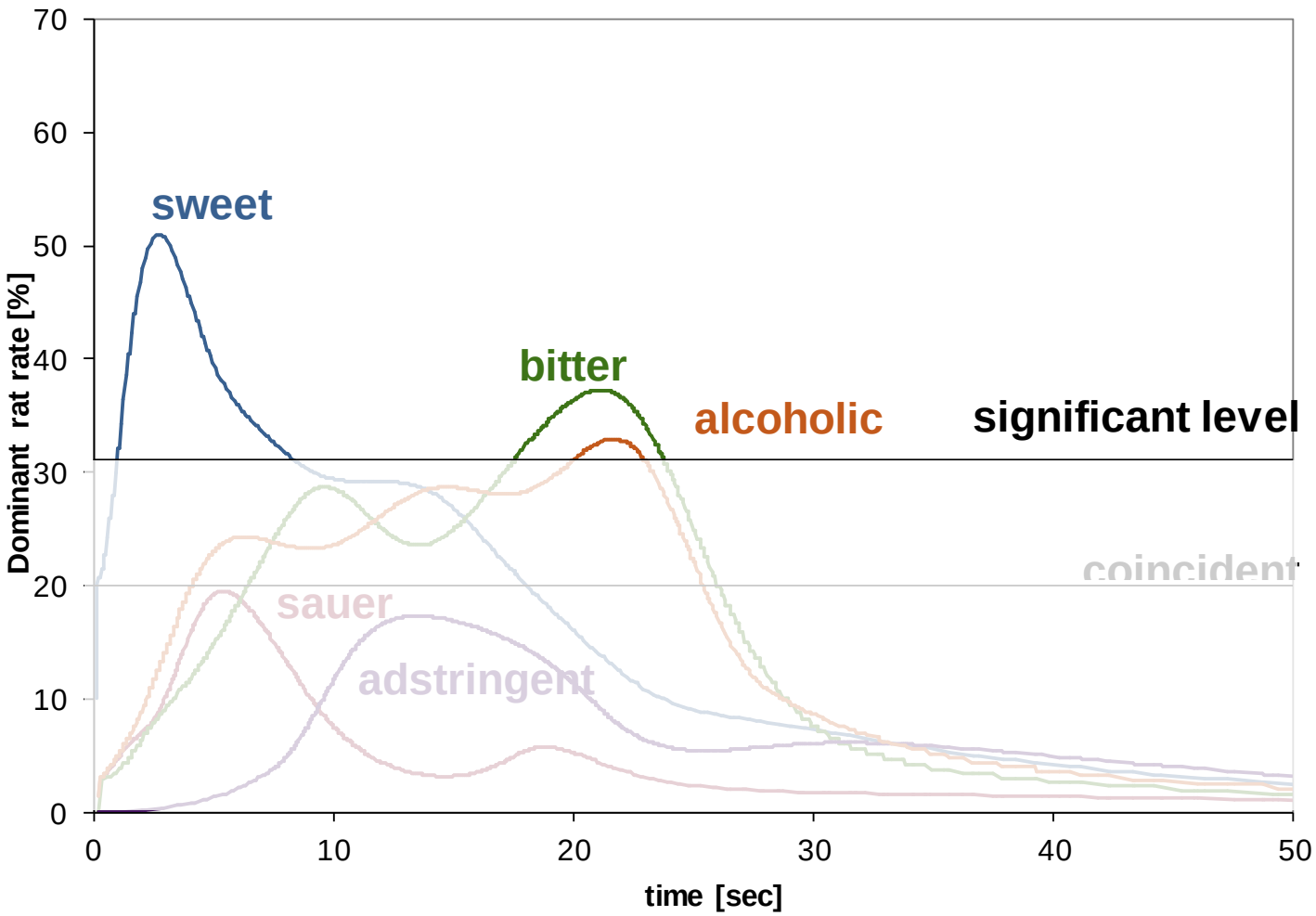
Intensive Bouquetwine

- Sugar concentration 90 – 115°Oe
- 6 – 9 g/L juice acidity
- only ripen, dried botrytis – up to 30%
- 50 mg/L SO_2, alternative 100 mg/L Lysozyme
- Mash treatment with enzyme; active carbon in juice
- Filtration up to 10 – 50 NTU
- Yeast with high aroma precursor (SIHA 7)
- Fermentation to begin 18°C, fermentation cooling depending on fermentation rate
- SO_2-Addition after fermentation, no MLF , early racking
- Favorable Residual sugar
- Sufficient free SO_2 for long storage

Sensorical profile grape processing 2009 Gewürztraminer (n = 18 P. x 3 R)

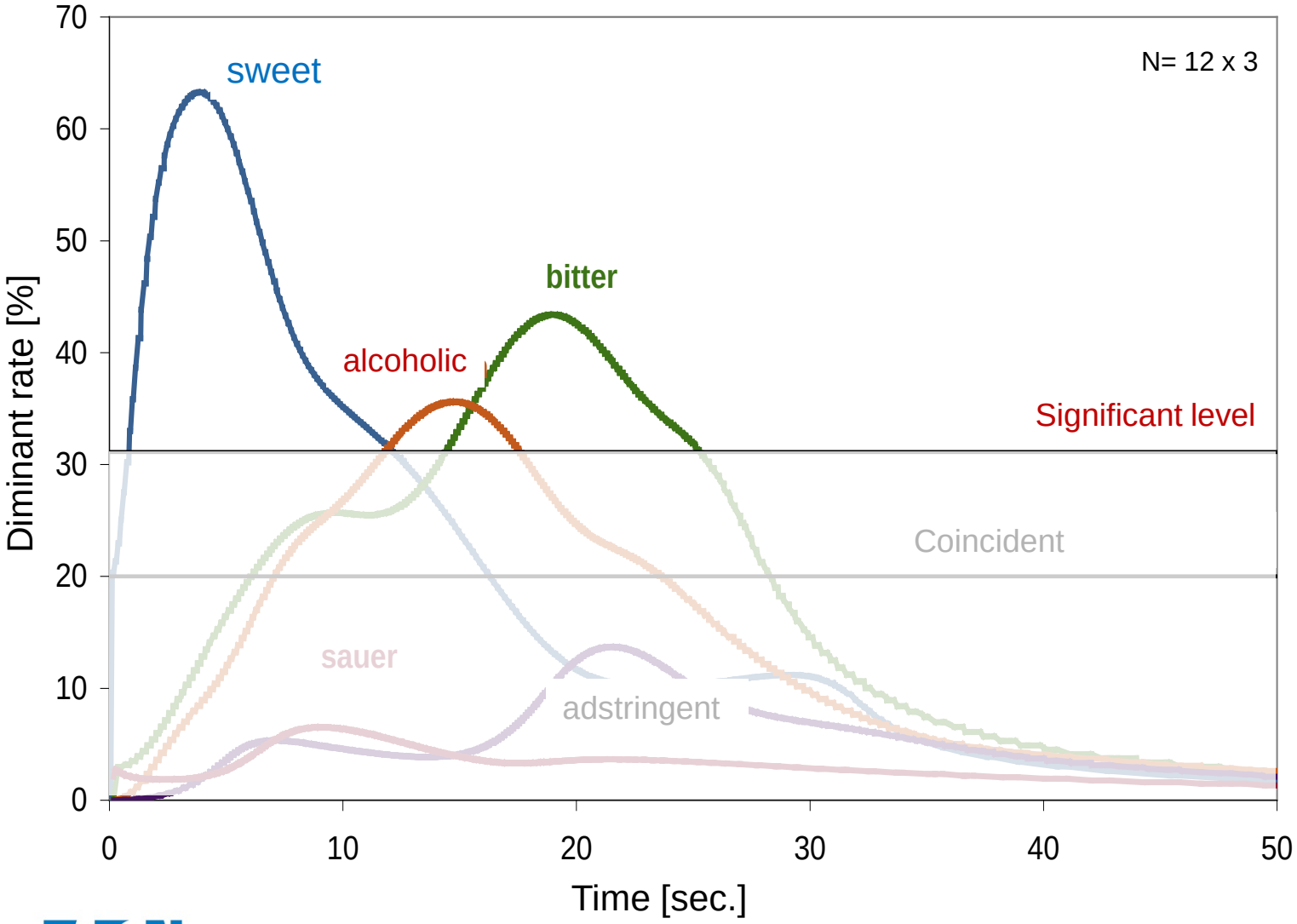


Mashing Gewürztraminer – 8 h holding time



N= 12 x 3

Mashing Gewürztraminer – 24 h holding time



Rosé – easy to drink Lifestyle

- Sugar concentration 65 – 85°Oe, 6 – 7 g/L juice acidity
- Desteaming without „Quetschung“ or whole cluster pressing
- Reduction of juice / Saignée process for red wines
- Juice enzymation, bentonite finning, as far there is botrytis grapes active carbon finning
- Clarification 10 – 30 NTU (Flotation N_2)
- Cold fermentation yeast (SIHA Cryarome, SIHA WhiteArome)
- Fermentation at the beginning 16°C,
  cooling down depending on fermentation rate
- High demand on yeast nutrient (Fermentation salt, SIHA SpeedFerm, SIHA Proferm H+2)
- SO_2- Addition 14 Tage after fermentation, no MLF, fast racking.
- Colour adjustment by red wine

Premium red wines without an overloading of tannins

- Sugar concentration 90 – 105°Oe
- 6 – 8 g/L juice acidity
- Desteaming with „Quetschung“ of 50% of berries
- 50 mg/L SO_2
- Cold mazeration 5 days at < 10°C
- Inocculation with yeast with positive Effect on polymerisation (Siha 10 – Red Roman, SIHA Rubino Cru)
- 5 – 8 days fermentation at 30°C
- MLF, also co-inccoluation with high cell count
- 30 mg/L SO_2 before storage in barrique
- Bottling before harvest of the following year

Cold mazeration of 2011, Pinot Noir
(B.Sc. Arbeit David Golitko, WeinCampus Neustadt)

Sample	Description
5+5 days	5 days cold mazeration 5 days fermentation/mazeration
5+10 days	5 days cold mazeration 10 days fermentation/mazeration
10 days	10 days fermentation/mazeration
15 days	15 days fermentation/mazeration

vintage 2011

Auer 2107t

Harvest: 15. Sept

Maceration and fermentation

50 L tanks (15 L juice/ 35 kg grapes) n = 2

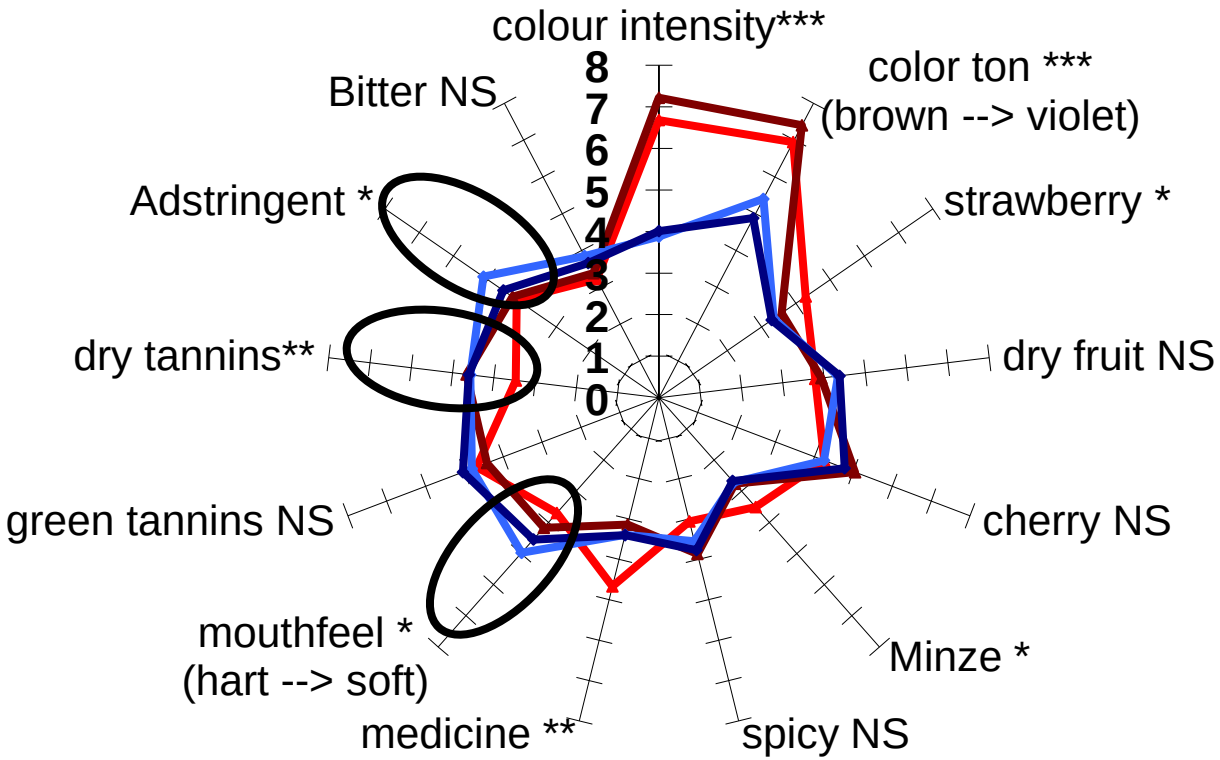
Cold mazeration: 5 °C

50 mg/L SO_2

Hefe:

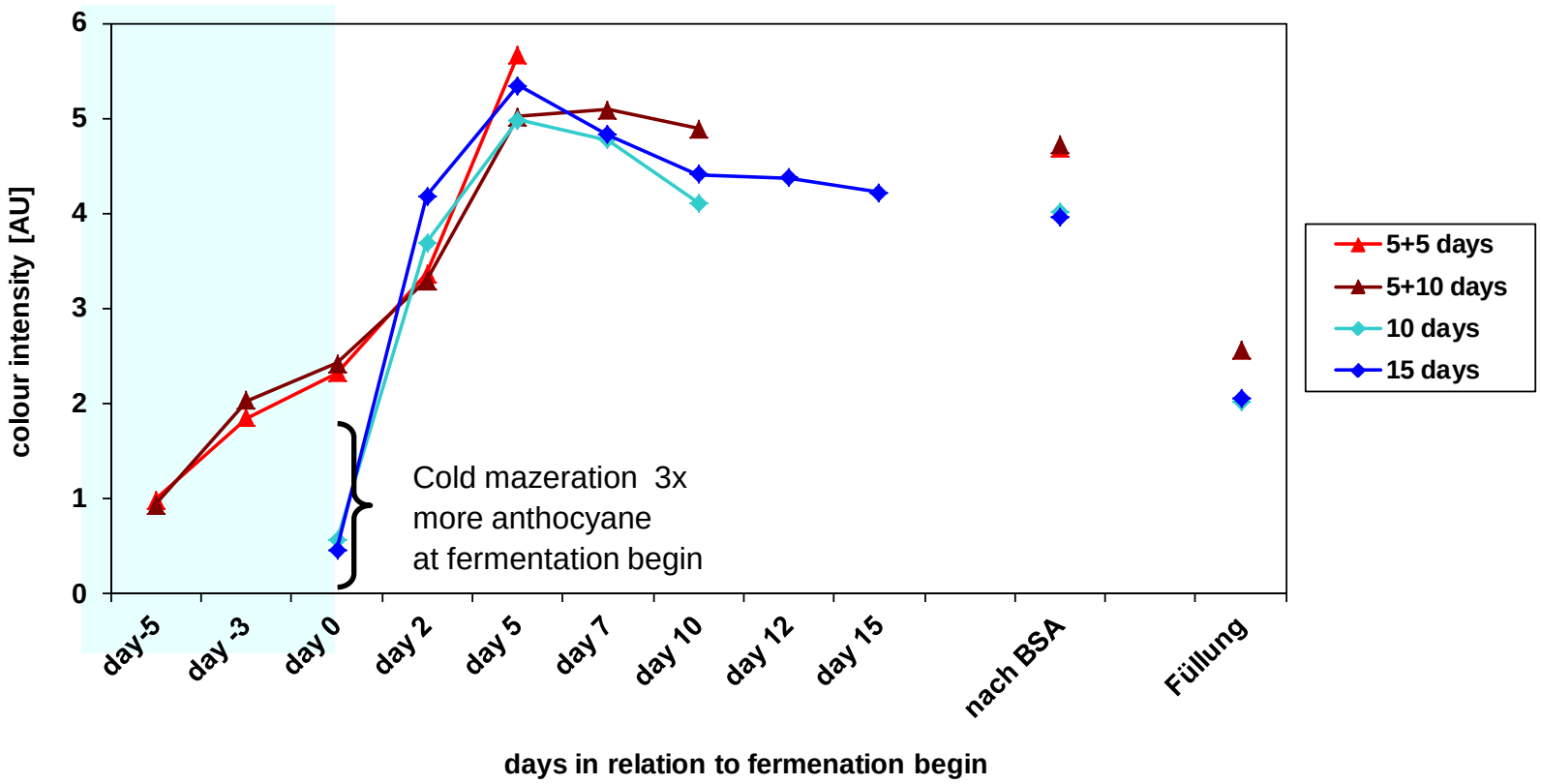
SIHA 10

Influence of cold mazeration on the sensorical profile of pinot noir 2011 (B.Sc. Arbeit David Golitko)



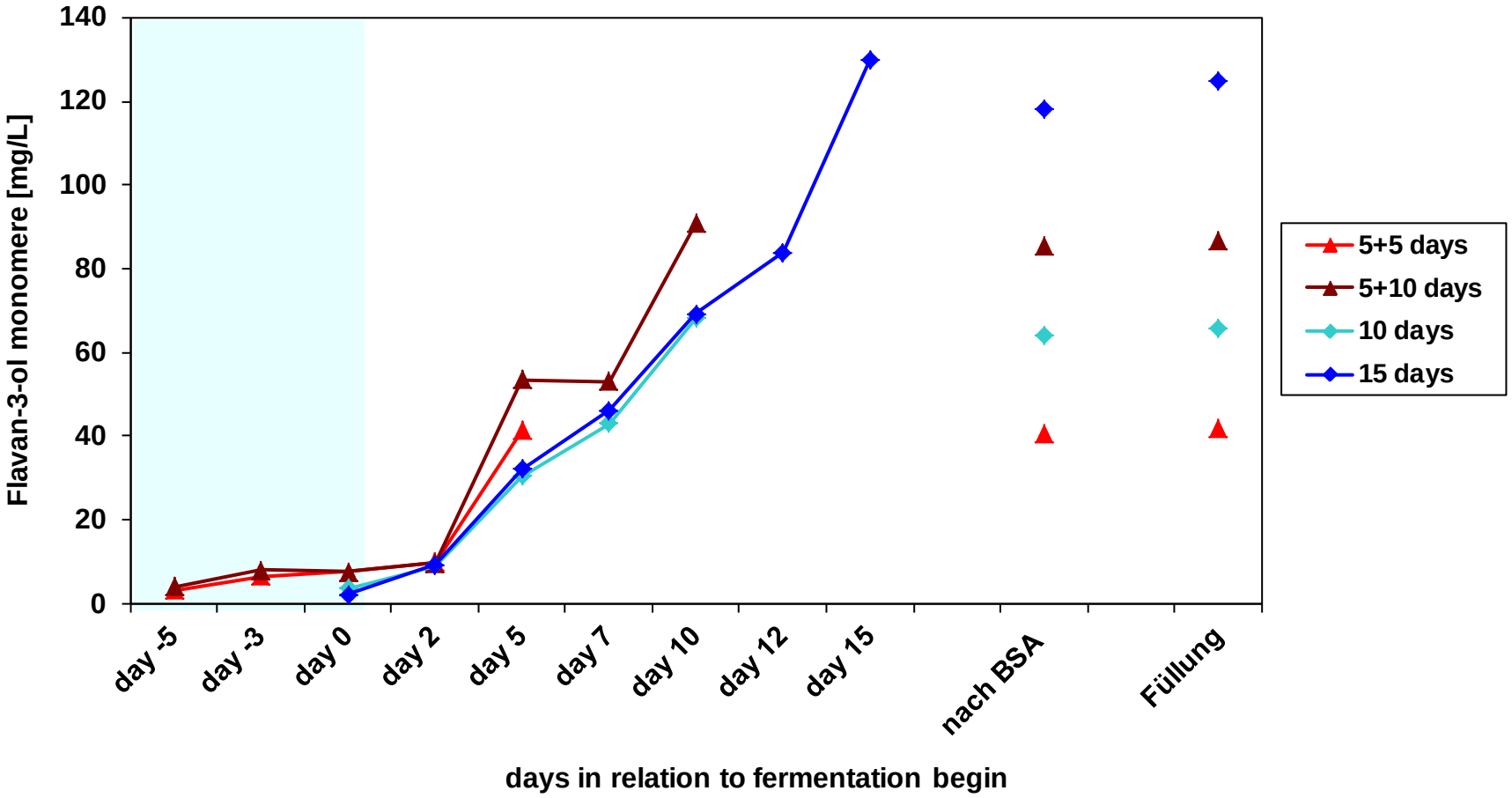
5+5 days | 5+10 days | 10 days | 15 days

Influence of colour intensity on pinot noir 2011 (B.Sc. Arbeit David Golitko)



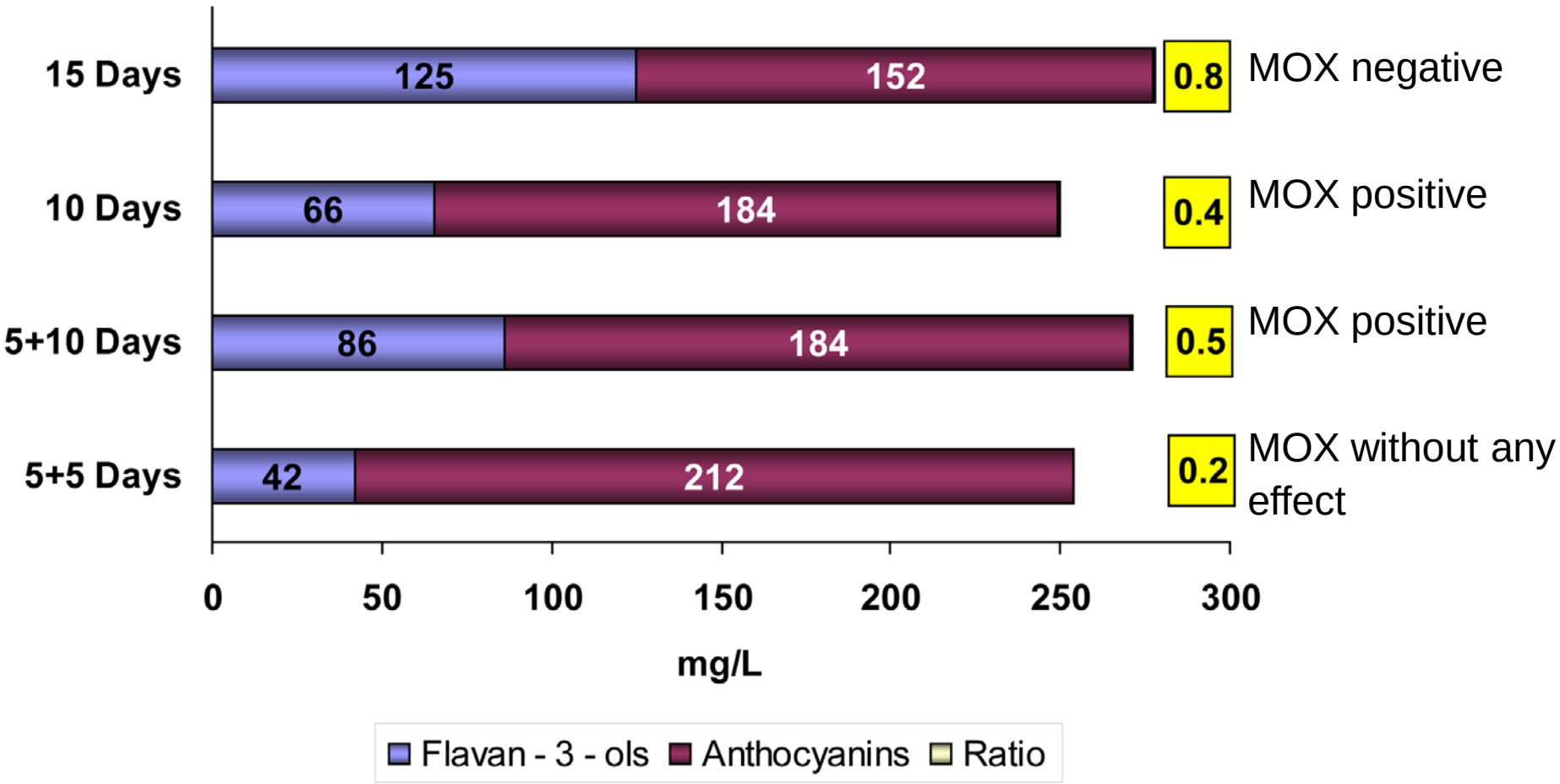
Cold mazeration

Extraction of phenole on pinot noir 2011
(B.Sc. Arbeit David Golitko, WeinCampus Neustadt)



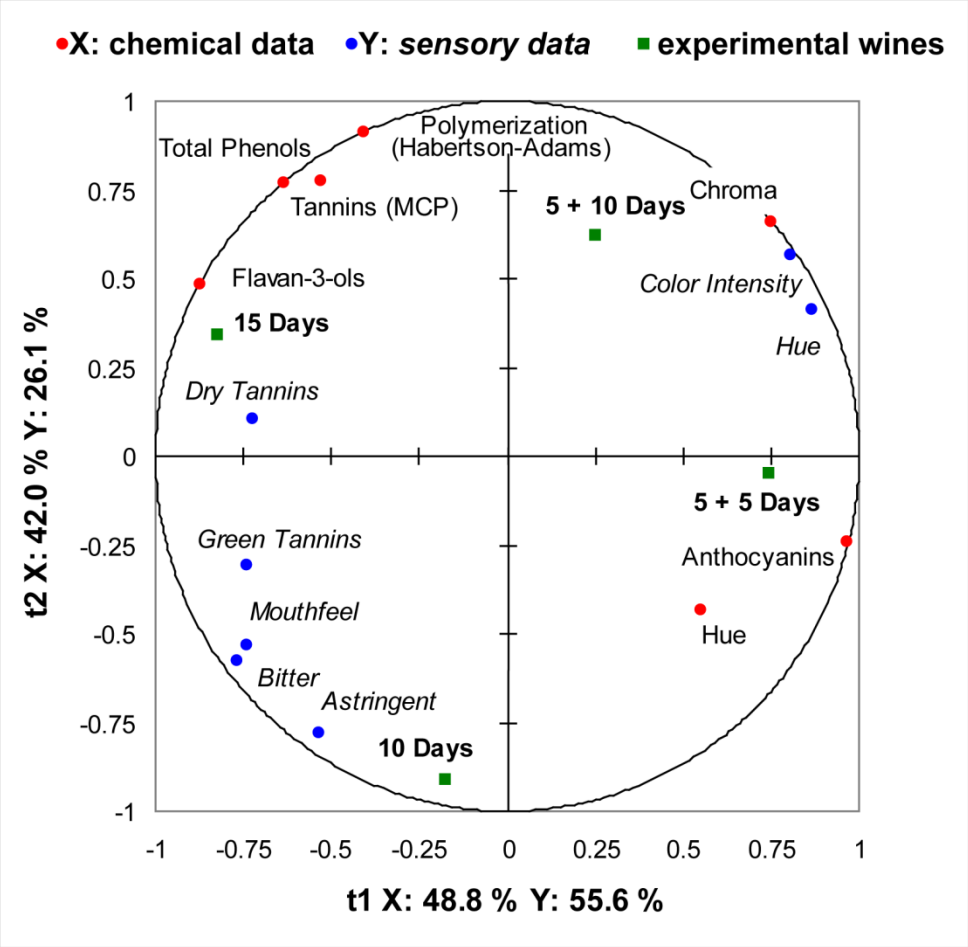
Cold mazeration

Influence of mazeration on ratio Flavanol – Anthocyane



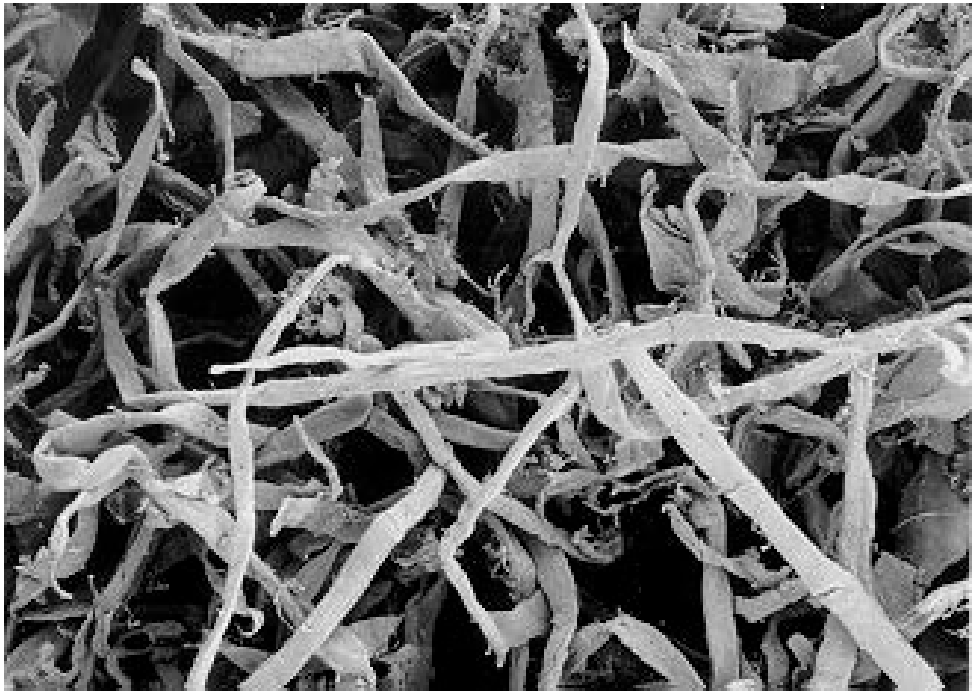
Durner et al, 2010, AJEV

Model of Sensorical data
(B.Sc. Arbeit David Golitko, WeinCampus Neustadt)



Cellulose versus DE

Cellulose fibre



Filtration with BECOCEL® CFA

- Es muss zunächst eine Stützschicht und anschließend eine Voranschwemmung im Rundlauf auf die Filtersiebe aufgetragen werden.

- Für die Grob- bzw. Feinfiltration sind unterschiedliche BECOCEL®-Dosagen und -Typen einzusetzen.

Filtration with BECOCEL®CFA

- BECOCEL® CFA 3500

  Aufbau einer Stützschicht

- BECOCEL® CFA 1200

  Einsatz zur Grobfiltration, Verwendung für die Voranschwemmung und Dauerdosierung

- BECOCEL® CFA 150

  Einsatz zur Grobfiltration, Verwendung für die Voranschwemmung und Dauerdosierung

- BECOCEL® CFA 100

  Einsatz zur Feinfiltration, Verwendung für die Voranschwemmung und Dauerdosierung

Anwendungstechnische Hinweise

Empfehlungen für die Grobfiltration

Dosagen:

1. Stützschicht bestehend aus 400 g/m^2 BECOCEL® CFA 3500

2. Voranschwemmung bestehend aus 500 g/m^2 BECOCEL® CFA 150 **nach dem 1. Abstich**
   Voranschwemmung bestehend aus 800 g/m^2 BECOCEL® CFA 150 **vor dem Schichtenfilter**

3. Laufende Dosage:
   0,2 – 0,5 g/l BECOCEL® CFA 150, **nach dem 1. Abstich**
   0,1 – 0,3 g/l BECOCEL® CFA 150, **vor dem Schichtenfilter**

Anwendungstechnische Hinweise

Empfehlungen für die Feinfiltration

Dosagen:

1. Stützschicht bestehend aus 400 g/m^2 BECOCEL® CFA 3500

2. Voranschwemmung bestehend aus 800 g/m^2 BECOCEL® CFA 100

3. Laufende Dosage
   0,1 – 0,5 g/l BECOCEL® CFA 100, **nach der Lagerung oder nach der Korrekturschönung**

Anmerkungen zur Filtration

Positiv

- Sehr geringe Verblockung
- Geringere Einsatzmengen von Filterhilfsmitteln
- Hohe Standzeiten
- Mit Cellulose erreicht man ähnliche Trübungsreduzierungen wie bei Kieselgur
- Geringe Farbaufnahme der Zellulose beim Rotwein

Negativ

- Staubentwicklung
- Schlechter Austrag der Zellulose nach Filtration
- Verkoster beschreiben einen leichten Verlust an Aroma

CelluFluxx®- Filtercellulose der Fa. Erbslöh Vorteile gemäß deren Beschreibung

- Produktschonende Filtration
- Deutlich verringerte Einsatzmengen an Filterhilfsmitteln
- Längere Filterstandzeiten und dadurch größere Gesamt-Durchsatzmengen
- Sechs Fasertypen:

  F15 Extra-Fein

  F25 Fein

  F45 Mittel

  F75 Mittel-Grob

  P30 Grob

  P50 Extra Grob
- Dosagen:

  1. Grundanschwemmung 400 g/m^2

  2. Voranschwemmung 800 g/m^2

  Laufende Dosage 0,1 bis 1,2 g/l

CelluFluxx®- Filtercellulose der Fa. Erbslöh Vorteile gemäß deren Beschreibung

- Geringe Produktverluste (1 kg CelluFluxx® = 2 Liter Produktverlust)
- Geringere Entsorgungsmengen
- Unproblematische Entsorgung, da 100 % Biomasse
- Keine gesundheitliche Gefährdung, da frei von kristallinen Bestandteilen
- Nicht abrasiv, dadurch keine Beschädigung von Pumpen und Rohrleitungen
- Keine Ablagerung im Kanalsystem
- Wirtschaftliches Gesamtergebnis (Berechnungsgrundlagen sind der Produktverlust, Celluloseverbrauch und die Entsorgung, Einsparung bis 0,08 Euro pro Liter möglich)

Ebenso wie Kieselgur besitzt auch Cellu-Fluxx® einen Eigengeruch u. –geschmack.

CelluFluxx®- Filtercellulose der Fa. Erbslöh

Fallstudie Rotweinfiltration, Technische Aspekte

	Kieselgur	**CelluFluxx**
Voranschwemmung **Grobfiltration, KG nicht optimiert eingesetzt**	50 kg grobe Kieselgur, 1,25 kg / m^2 Filterfläche	5 kg P30 und 20 kg F45, 0,625 kg / m^2 Filterfläche
Dauerdosierung, gesamt	400 kg	175 kg
Filterhilfsmittel-Verbrauch, gesamt	450 kg	200 kg
Filtrierter Wein	330.000 l	420.000 l
Spezifischer Verbrauch	1,36 g/l	0,48 g/l
Filterstandzeit	10 h	10 h

CelluFluxx®- Filtercellulose der Fa. Erbslöh Fallstudie Rotweinfiltration, Wirtschaftliche Aspekte

	Kieselgur	**CelluFluxx**
Filterhilfsmittelkosten €/kg **realistisch**	0,65	2,95
Filterhilfsmittelkosten, gesamt €	292,5	590,0
Weinverlust 1 kg FHM bindet ca. 3 l Wein (l) **zu großer Weinverlust**	1.350	775
Verkaufspreis Wein angenommen €/l	2	2
Einnahmeverlust €	2.700,0	1.550,00
Abfallaufkommen (bei 25% TS/kg)	1.800	900
Entsorgungskosten angenommen 100 €/t (€) **liegt oft nur bei 15 €/t**	180,00	90,00
Tatsächliche Filtrationskosten €	3.172,50	2.230,00
Einsparpotential mit Cellulose € absolut weinabhänig		**942,50**