



TRIAL SESSIONS : Multi-winery studies of
Pinot Noir vinification methods.

60-ish winemakers from across Victoria

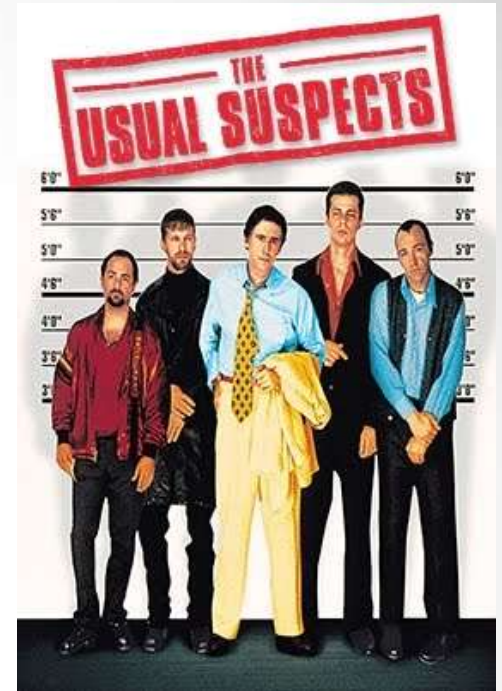
Who is involved?.....

Why do we do it?.....

Prompted by a wish to make winemaking decisions based on evidence, using practical trial work scaled to replicate our usual winemaking environment.

Resultant wines : Lab and Organoleptic analyses

Some past topics.....



2012...

Malolactic Fermentation

Inoculated vs Indigenous

INOCULATED

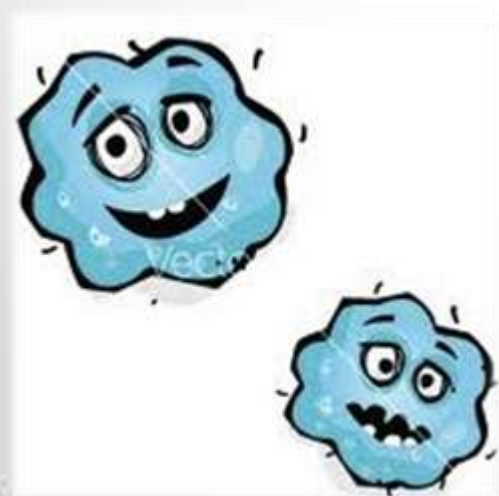
Wine inoculated with commercially available MLB culture at the post-pressing stage and managed as winery deems appropriate

vs

INDIGINOUS

Wine was NOT inoculated, and allowed to proceed through an indigenous derived MLB fermentation and managed as winery deems appropriate.

Trial examines outcome of process, not just action...



2014....

Batonnage in Pinot Noir

Single batch Pinot Noir
sourced from single block

Fruit vinified as single batch of wine
and transferred to duplicate sets of
barrels....

Treatment One
CONTROL

Treatment Two
BATONNAGE

2011... Enzyme v No Enzyme

2015... Racking v No racking

... Pumping v Gravity

The background of the slide is a white surface covered with numerous splatters and droplets of dark red liquid, resembling blood. The splatters are of various sizes, from small dots to larger, more complex shapes. Some droplets are elongated and appear to be dripping downwards. The overall effect is one of a violent or messy event.

Transfusion Trial

Control vs Transfusion
a multi-winery trial

VPNW 2013

Initial idea...

- Chaptalisation (sucrose)
 - Alc% : prolonged fermentation :
 - Richer, fuller, complex, savoury.
- Consideration for publication of results
- Request made via Creina Stickley AWRI
 - Wine Industry Technical Advisory Committee (WITAC)
 - Food standards Australia & New Zealand (FSANZ)
- Exemption not granted
 - Participants not able to use trial wine in commercial blend



- Plan B = Transfusion (juice)
 - Using juice to manipulate concentration of sugar over primary fermentation
- Bob Dambergs
 - Transfusion and coffee pots

Transfusion Trial

- The Transfusion...
 - Initiated November 2012
 - to be conducted Vintage 2013
 - assessed November 2013 (VPNW13)
- Participating wineries (8)...

Curly Flat – Phil Moraghan

Domaine Chandon – Dan Buckle

Dromana Estate – Duncan Buchanan

Lethbridge Winery – Ray Nadeson

Moorooduc Estate – Richard McIntyre

Paradigm Hill – George Mihaly

Tarrawarra – Clare Halloran, Adam McCallum

Ten Minutes by Tractor – Jeremy Magyar

Hypothesis

- The process of removing a portion of juice prior to fermentation, and subsequently returning this juice at the late stages of fermentation....

... will produce a different outcome

.... than vinifying the same fruit as per the wineries usual methods, all else remaining the same where possible.

What are we looking at?....

Prompted by a wish to make winemaking decisions based on evidence, using practical trial work scaled to replicate our usual winemaking environment.

- The TRANFUSION Trial...

CONTROL

Wine vinified and managed as winery deems appropriate.

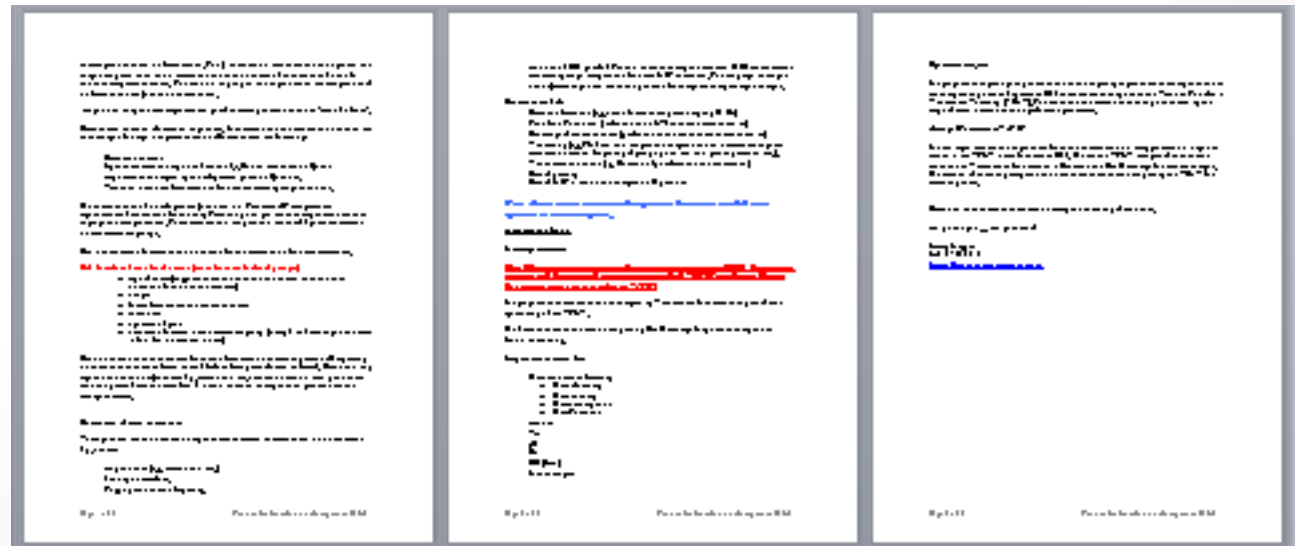
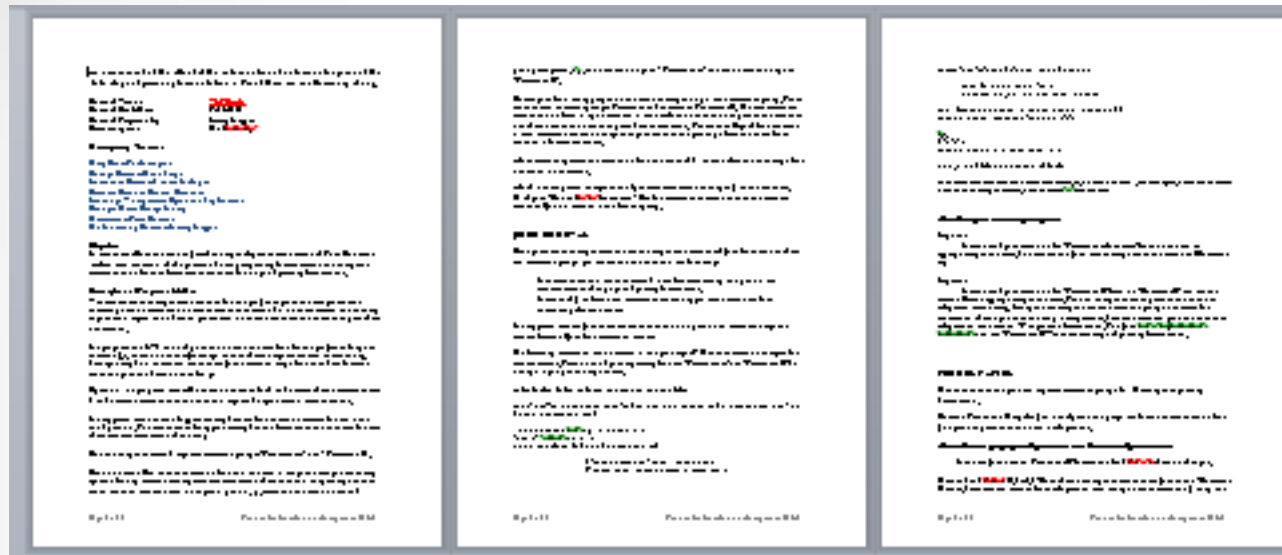
VS

TRANSFUSION

Wine vinification subject to juice removal prior to fermentation, then returned at late stage of fermentation, and managed as winery deems appropriate.

Trial examines outcome of the **process** not just the action...

Trial Protocol



Method ...

Single batch Pinot Noir
(MV6) sourced from single
block

Fruit randomly split and
processed

Treatment One
CONTROL

Managed as winery
deems appropriate ... as
identically as possible

Treatment Two
TRANSFUSION

Managed as winery deems
appropriate ... as
identically as possible

The method ...



- Fruit received and randomly split into two treatment groups
- Destemmed into vats, equal mass for each arm of trial
- 24hr period before initial analyses undertaken (Baumé/°Brix)
- Juice volume corresponding to 1 baumé calculated

Transfusion procedure...

Vat 1 = 1000 kg fruit = 700 L juice

Calc:

1 baumé = 54.7 L @ 12.8 baumé



Refrigerate at 4°C to inhibit fermentation of "transfusion juice".

Reintroduction of juice ...



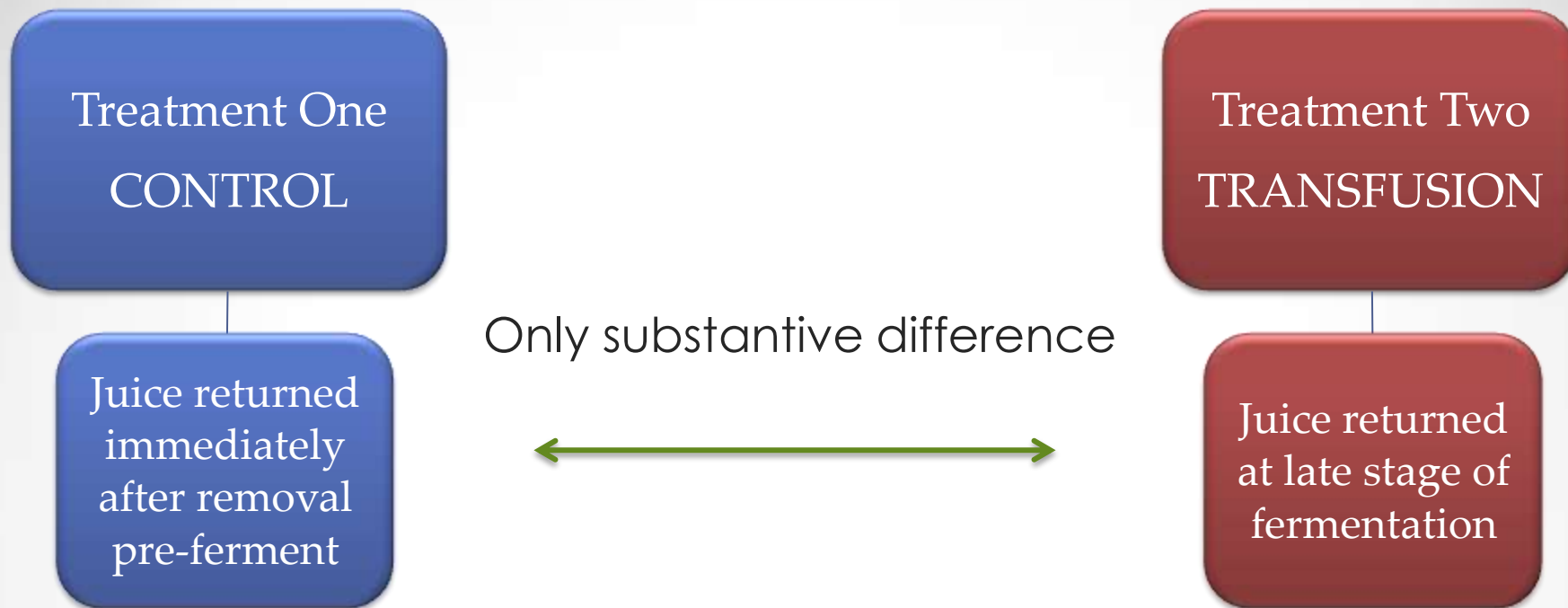
Juice warmed from 4°C → >16°C
as not to temp shock yeast

Juice returned to transfusion treatment vat
at desired fermentation stage of:

1 – 2 Baumé (1.8 – 3.6°Brix)

Both arms from this point on managed
identically where possible.....





Wineries take their usual approach to manage each treatment as deemed appropriate

...managed appropriately ...

...managed appropriately ...

@ 6 months : Lab Analysis (Vintessential) = Standard lab profile
 Lab Analysis (A. Carew, B. Dambergs) = Tannin + Phenolics

● @ 7 months: VPNW 2012: Organoleptic analysis

What else was different ...

- Transfusion treatment : Volume of juice removed over majority of primary fermentation period
- Reintroduction procedure may result in other influences through action : temperature modification, additional oxygen etc.

Uniformity

- Source of fruit
- Vinification method
- Additions, where possible ie. H_2T
- Oak – matching barrels (>2-3 each treatment)
- Winemaking, racking, topping, SO_2 add

Organoleptic assessment

6 (8) wineries

2 wines each

12 glasses

Each of these parameters are to be scored...

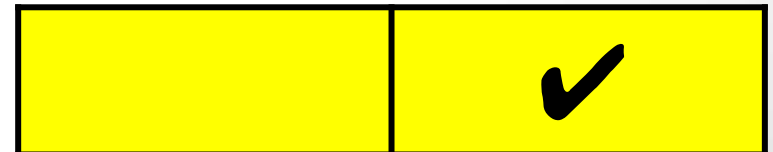
- **a. fruit**
- **b. complexity**
- **c. structure / texture**
- **d. balance**
- **e. palate length**

1 = low
2
3
4 = high

Can you detect any difference between the 2 wines (pair)

YES or NO

For each winery, which wine do you prefer...



the form...

VPNW 2013 Transfusion Trial

Name(optional): _____

1) Score each box

1	2	3	4
Low			
High			

2) Can you detect any difference between the 2 wines??.....CIRCLE: ☒ Yes or ☐ No

3) Tick preferred wine for each winery

[illegible]

your time starts now.....

VPNW 2013 Transfusion Trial

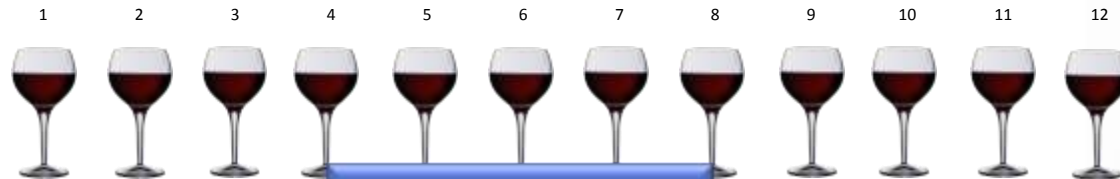
Name (optional): _____

- 1) Score each box
- 1 ~~7~~ Low
2
3
4 ~~7~~ High

Insert number
1 or 2 or 3 or 4
here

2) Can you detect any difference between the 2 wines? CIRCLE: Yes or No

3) Tick preferred wine for each winery



Winery	1		2		3		4		5		6	
	A	B	A	B	A	B	A	B	A	B	A	B
a. Fruit												
b. Complexity												
c. Structure / Texture												
d. Balance												
e. Palate length												
Can you see any difference ?	Yes / No		Yes / No		Yes / No		Yes / No		Yes / No		Yes / No	
f. Preferred wine [tick preference]												

Circle
Yes / No
here

Place a single ✓
in one of these
boxes

Laboratory analyses ...

- The following were measured in all of the wines ...



*Acetic Acid (W01)

*Alcohol (W33)

*Glucose & Fructose (W03)

*Glycerol (W28)

*Malic Acid (W04)

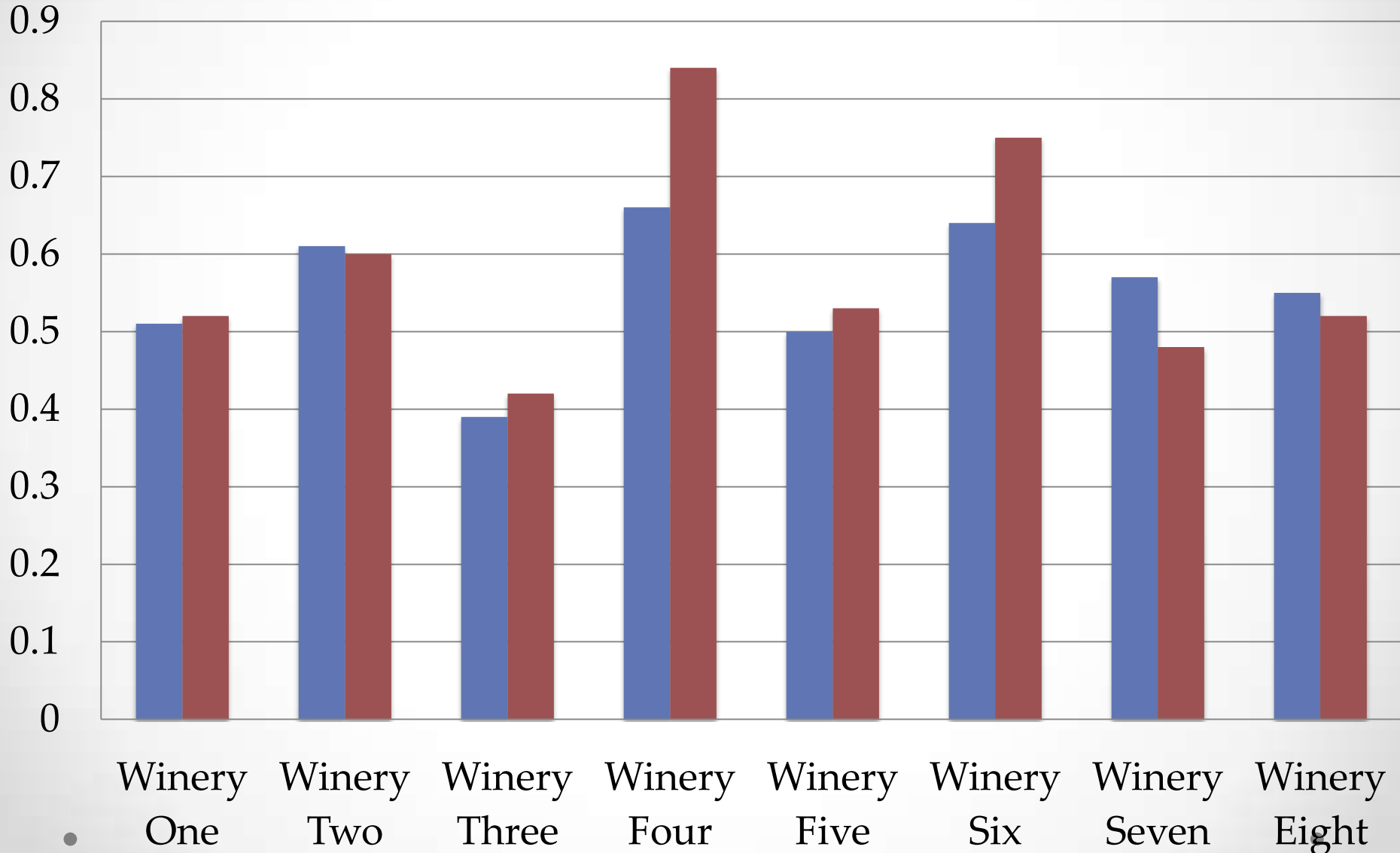
*pH (W05)

*Titratable Acidity pH 8.20 (W09)

*4ep/4eg

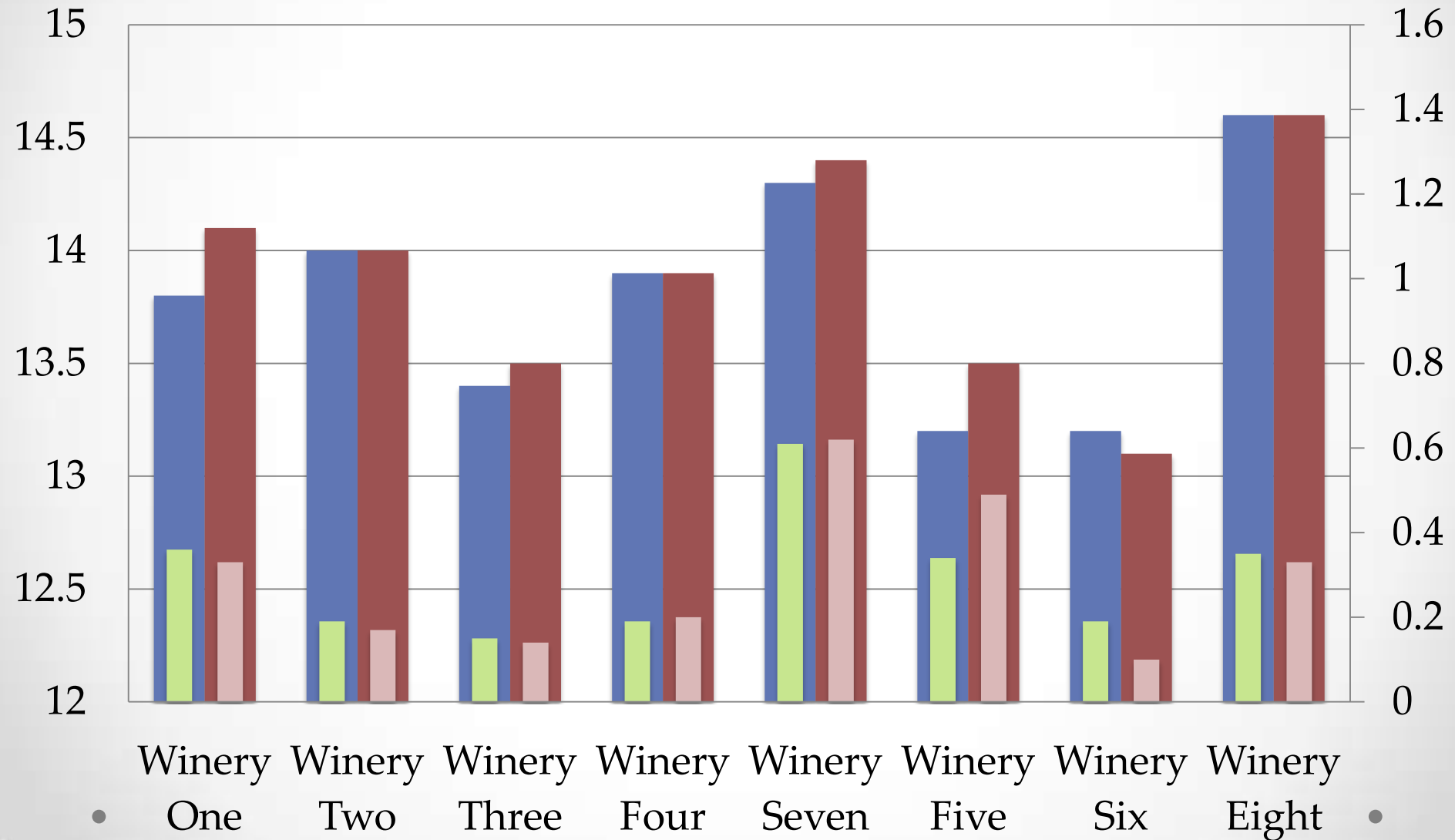
Acetic Acid (g/L)

Control
Transfusion



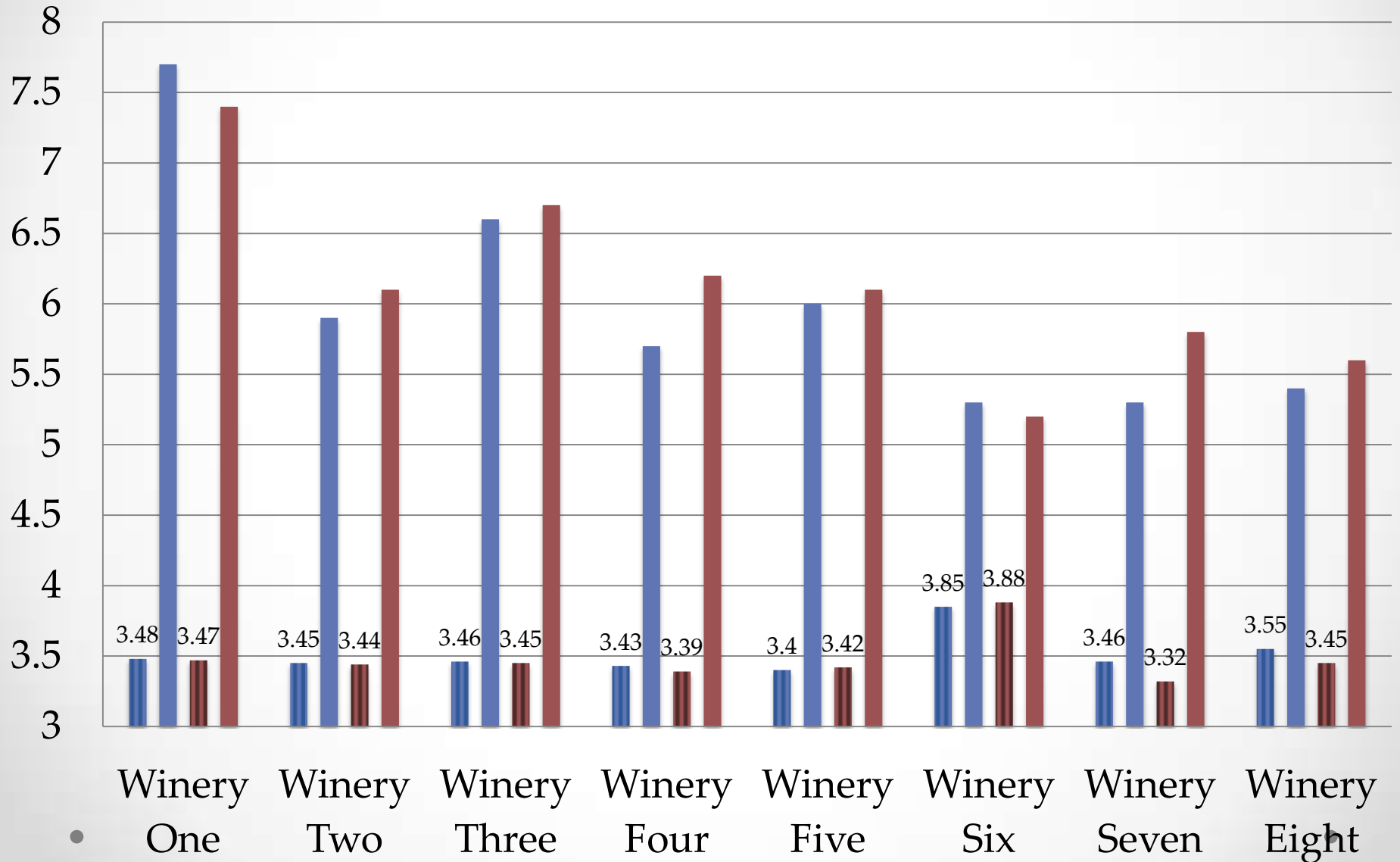
Alc % v/v : Glucose+Fructose (g/L)

■ Control : Alc % ■ Transfusion : Alc % ■ Control : G+F ■ Transfusion : G+F



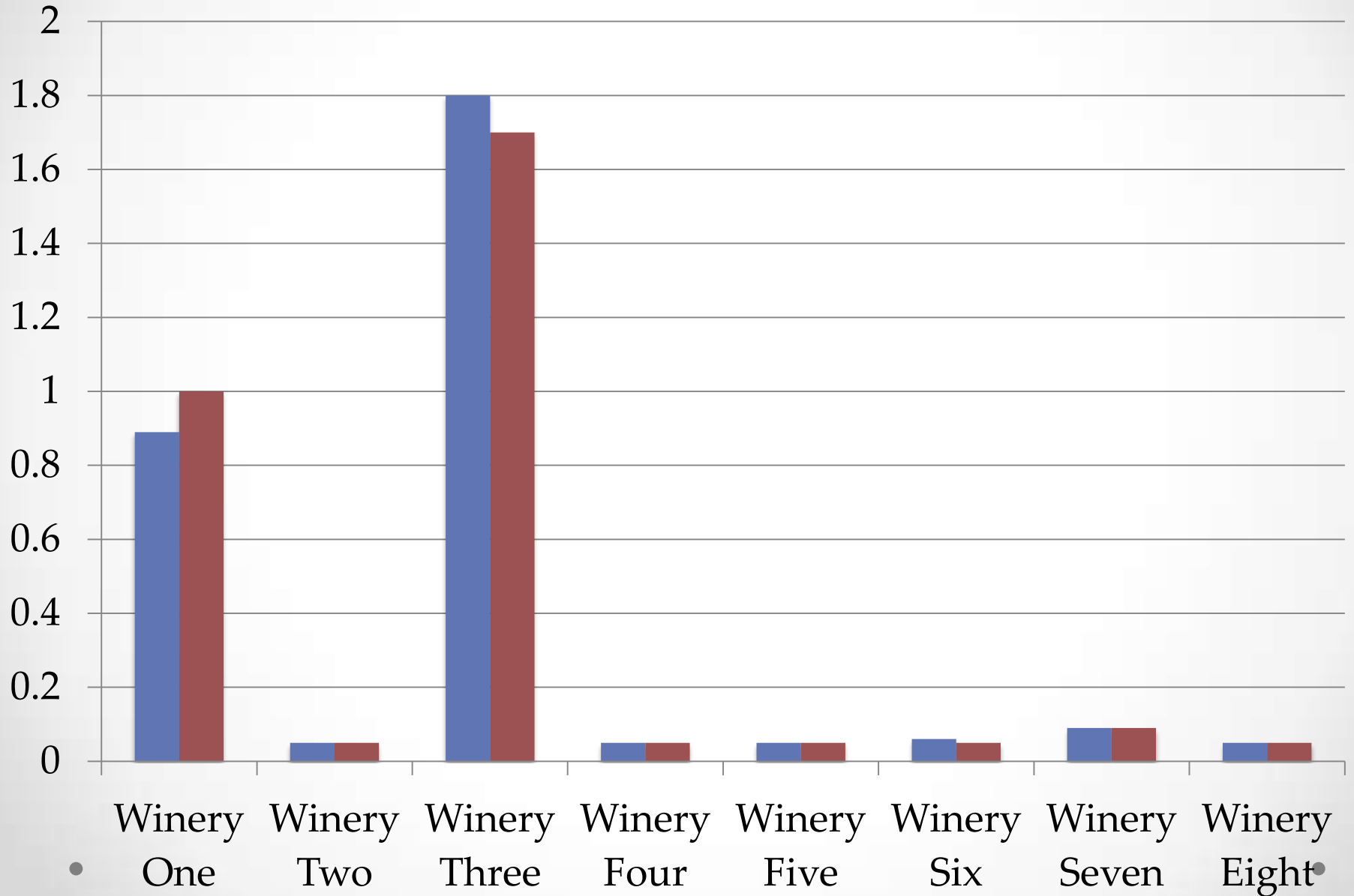
pH : TA (g/L)

Control : pH Control : TA Transfusion : pH Transfusion : TA



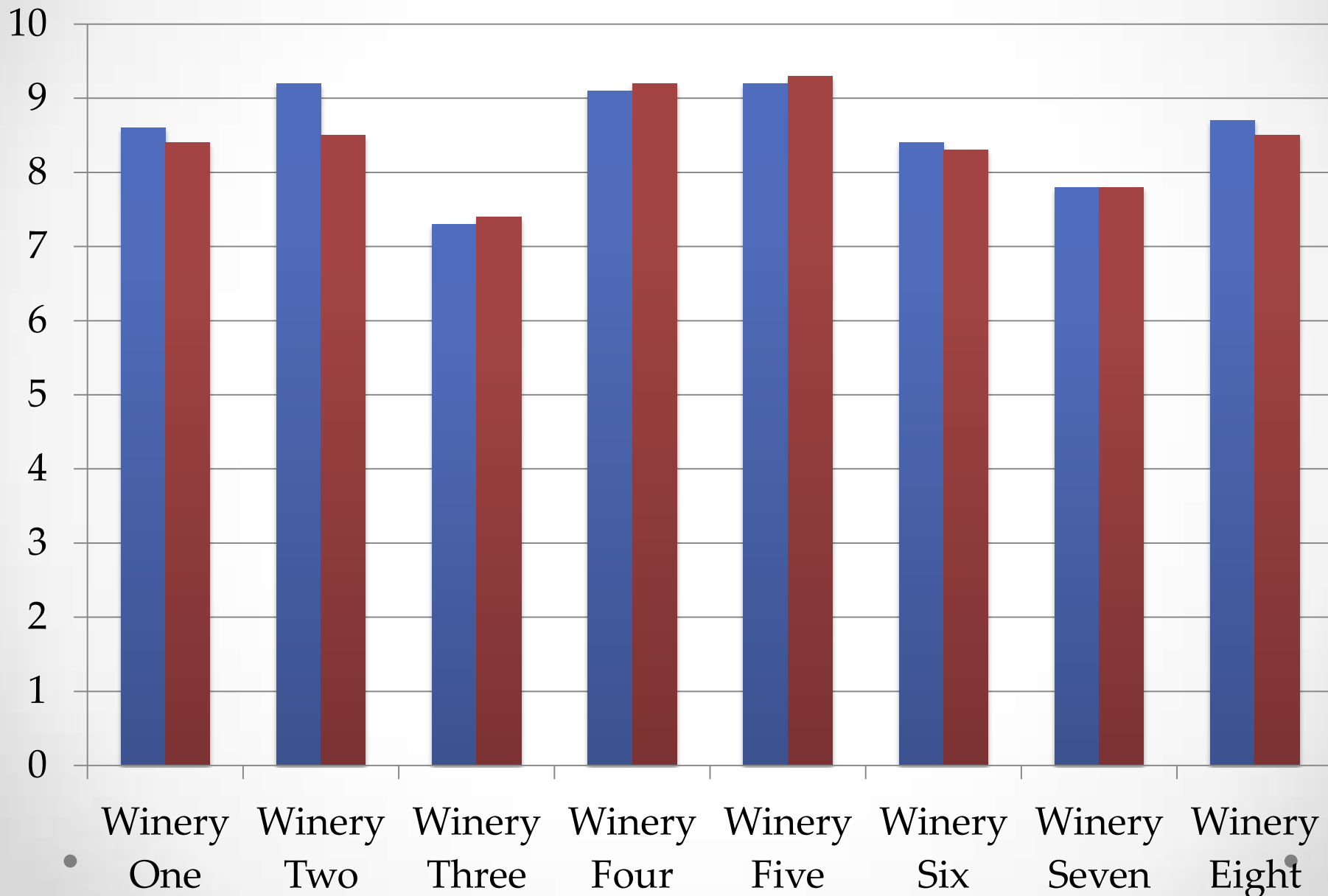
Malic Acid (g/L)

Control
Transfusion



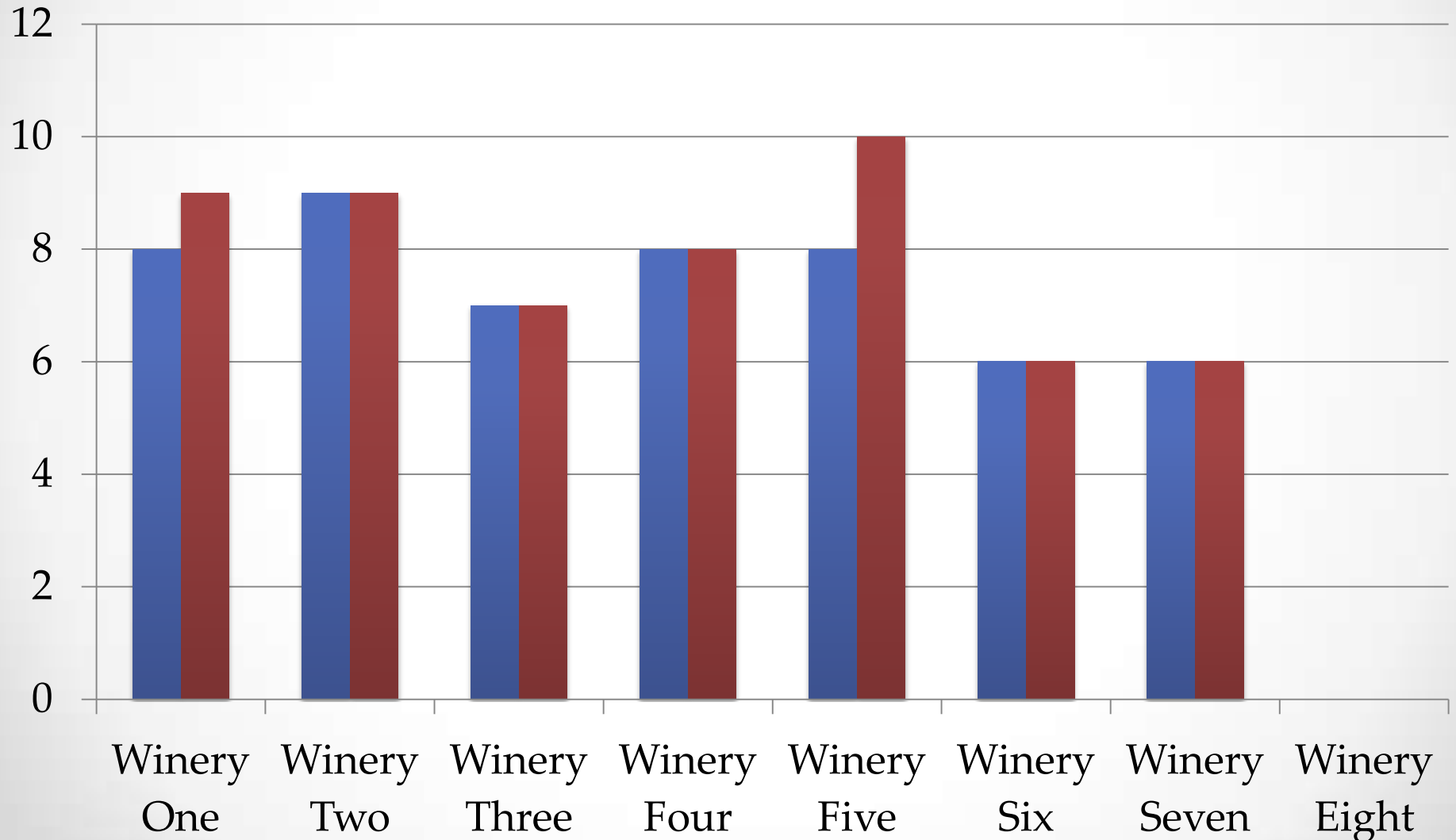
Glycerol (g/L)

Control
Transfusion



Length of fermentation (days)

Control Transfusion



Anna Carew Bob Dambergs . . .



“Impact of
“Transfusion” on
colour / tannin.”

Analysis : VPNW
Transfusion trial
samples



Phenolics 101

➤ Tannin

- Total tannin i.e. pigmented and non-pigmented
- Increases slowly while wine is on skins (extraction needs alcohol and heat)
- Skin tannin is more readily extracted than seed tannin
- Decreases slightly with aging

➤ Total phenolics

- Anything that absorbs UV at 280 nm
- All forms of tannin, anthocyanins, phenolic acids, flavonols etc

➤ Total Pigment

- Free anthocyanin and pigmented tannin
- Increases rapidly while wine is on skins then decreases gradually with age

➤ Free anthocyanin

- Increases quickly while on skins (freely soluble)
- Decreases quickly off skins (after 5 years all consumed)

➤ Pigmented tannin -

- “pigmented polymers”, “non-bleachable pigment”
- Formation starts during fermentation
- Gradual increase after wines taken off skins and during maturation
- Formation promoted by yeast metabolites
- Formation promoted by micro-oxidation and barrel maturation
- Strongly promoted by post-ferment extended maceration

➤ Colour Density

- Intensity of the wine colour
- Corrected for alcohol concentration, pH and SO₂

➤ Hue

- The nature (tint) of the colour
- Corrected for alcohol concentration, pH and SO₂
- As hue increases, garnet/brown tints increase
- Low hue wines are plummy/purple
- Hue increases with age

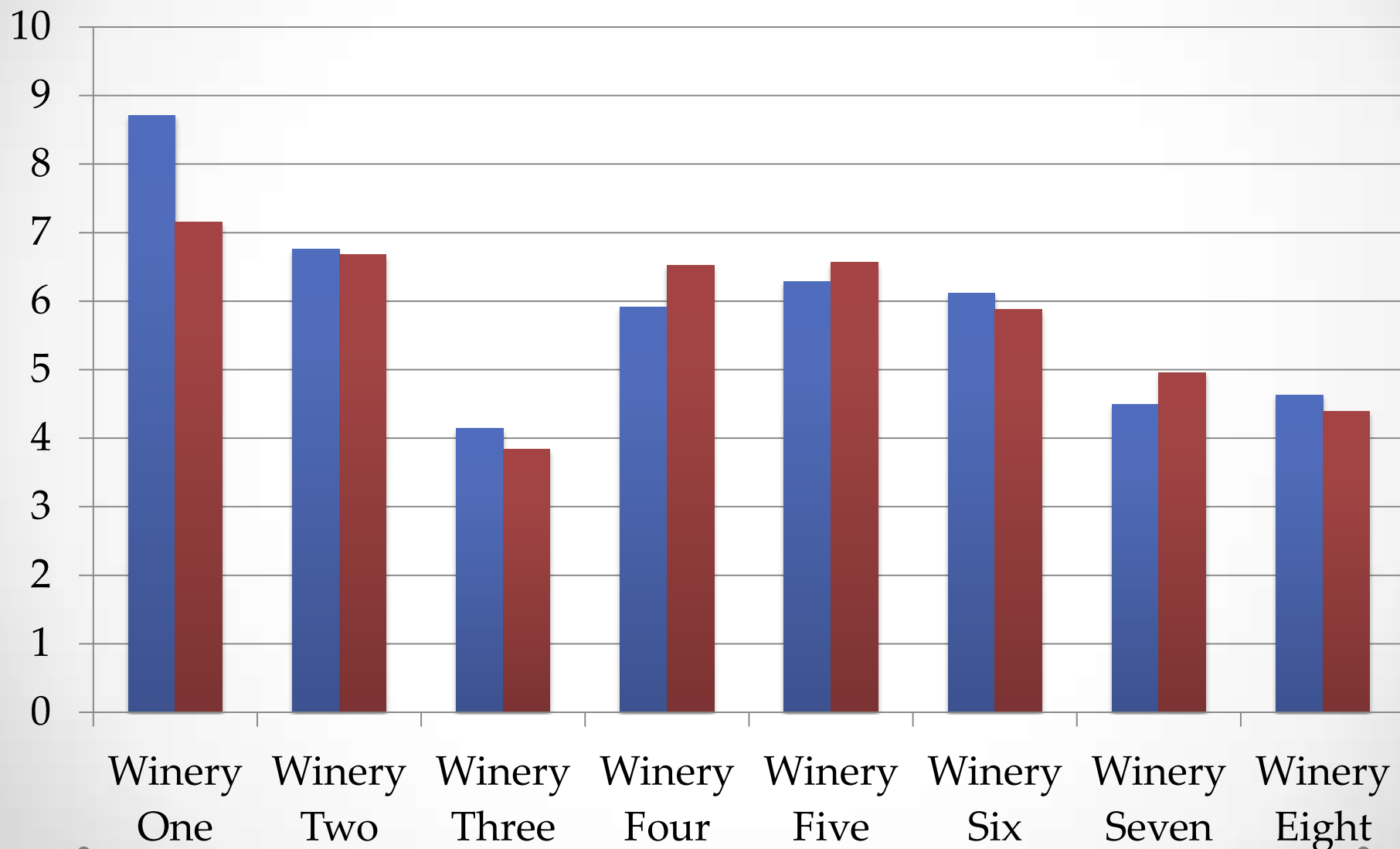
➤ HueSO₂

- similar to hue but measured in the presence of high SO₂
- Indication of the hue of stable pigment with the free anthocyanin effect removed
- Wines with low hue SO₂ will tend to keep plummy/purple colours during aging
- Strongly affected by yeast strain and maceration methods

Colour Density (AU)

■ Control

■ Transfusion

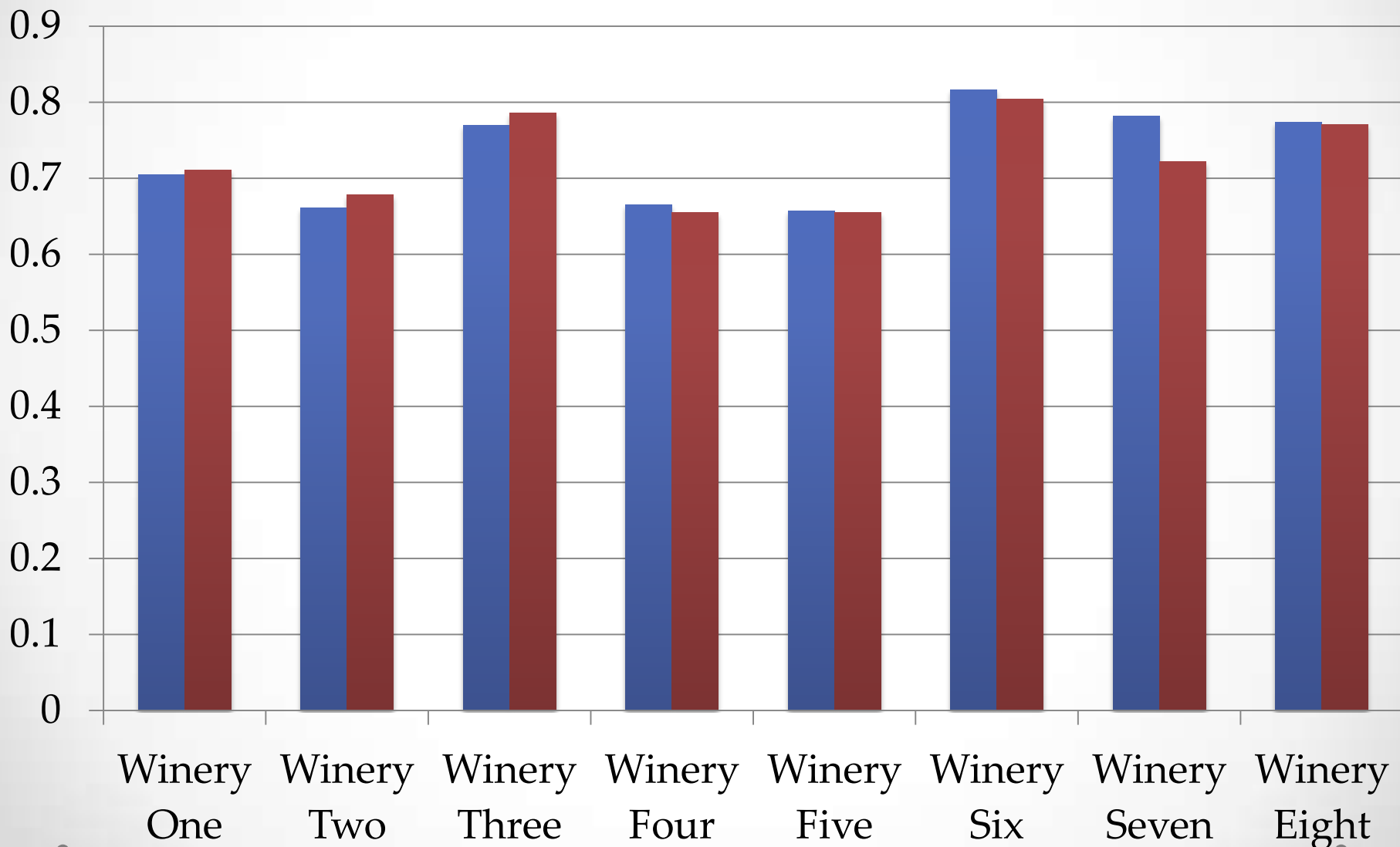


Hue

Control

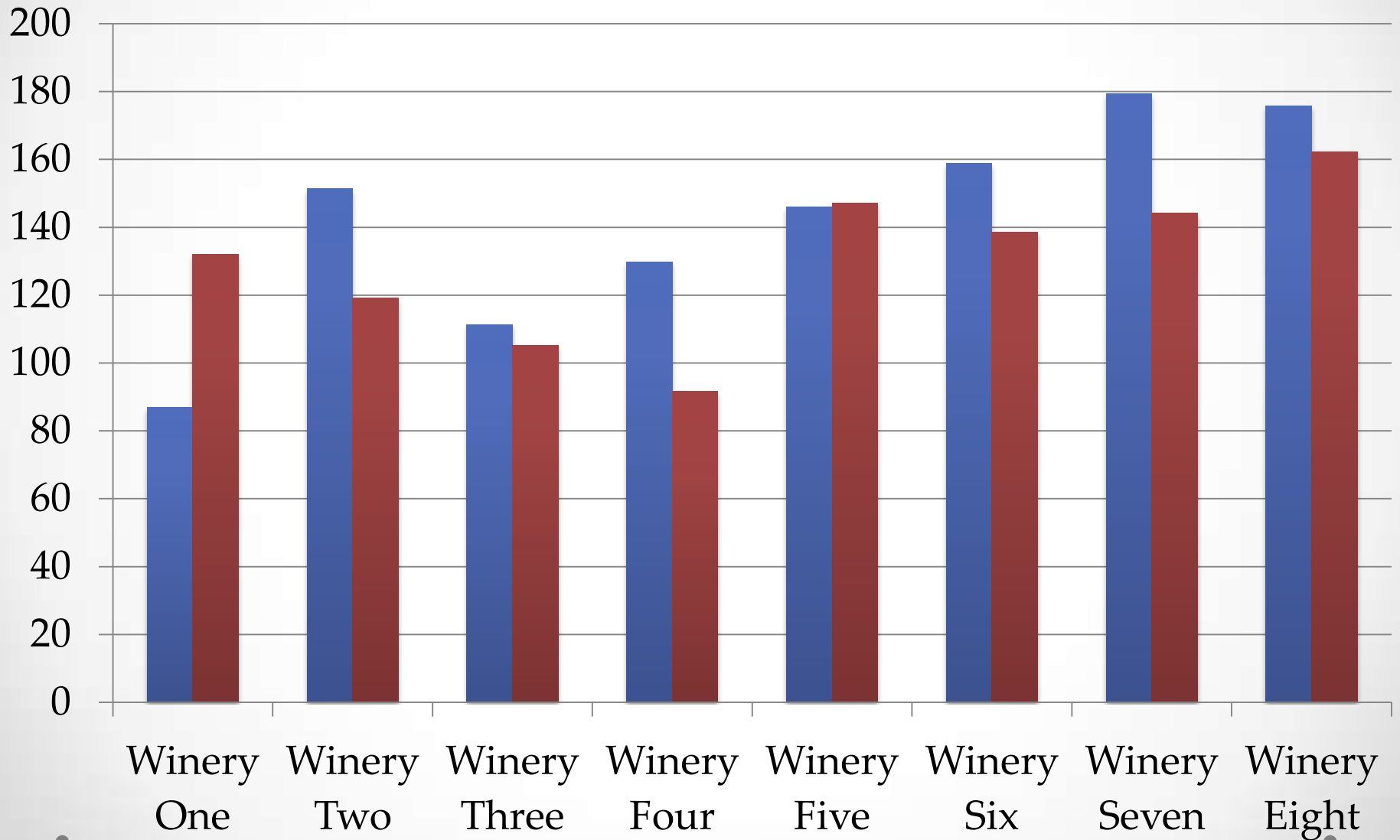
Transfusion

↑ : purple → red → garnet, orange



Anthocyanin [free] (mg/L) ■ Control

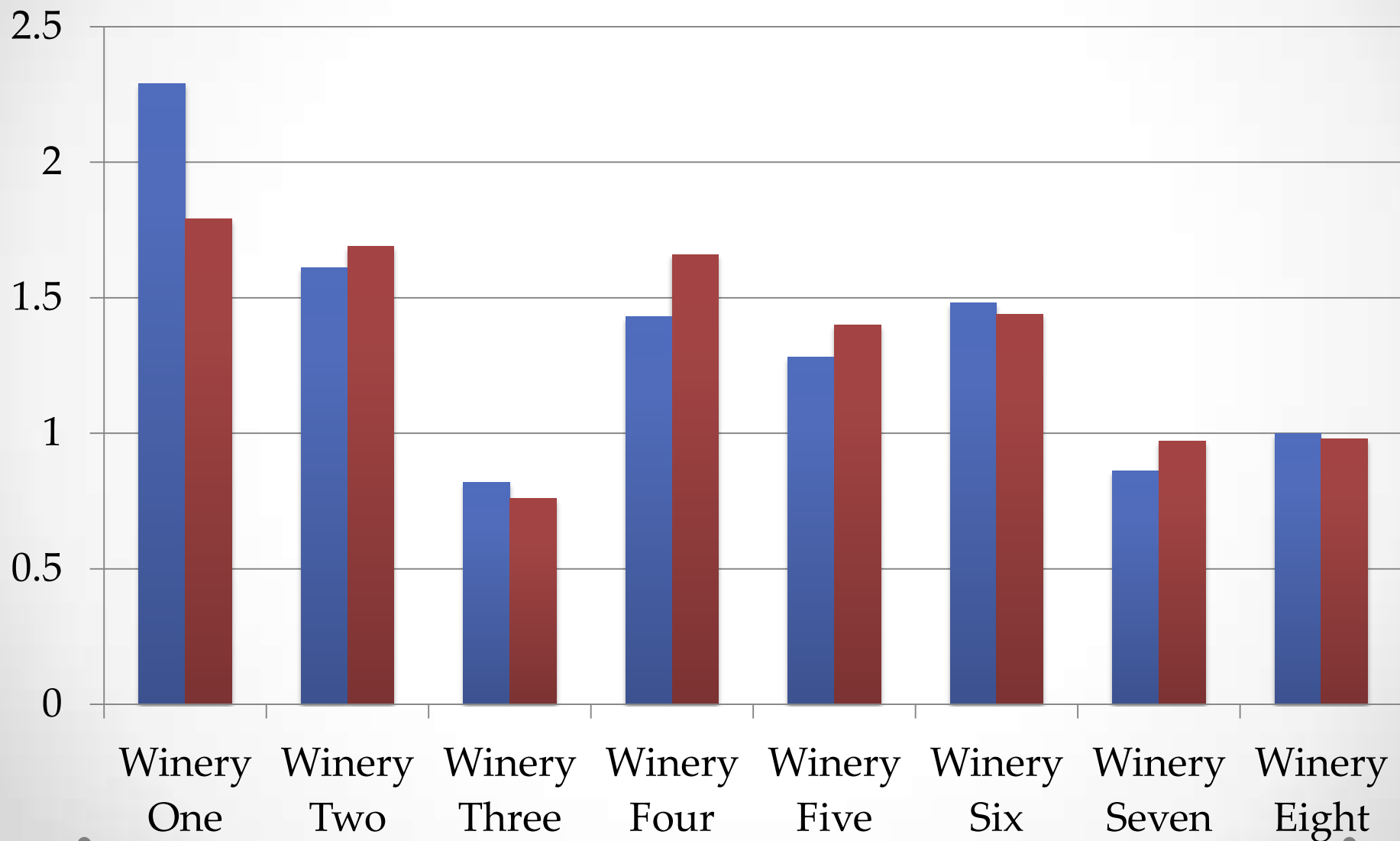
■ Transfusion



Non-bleachable pigment

Control

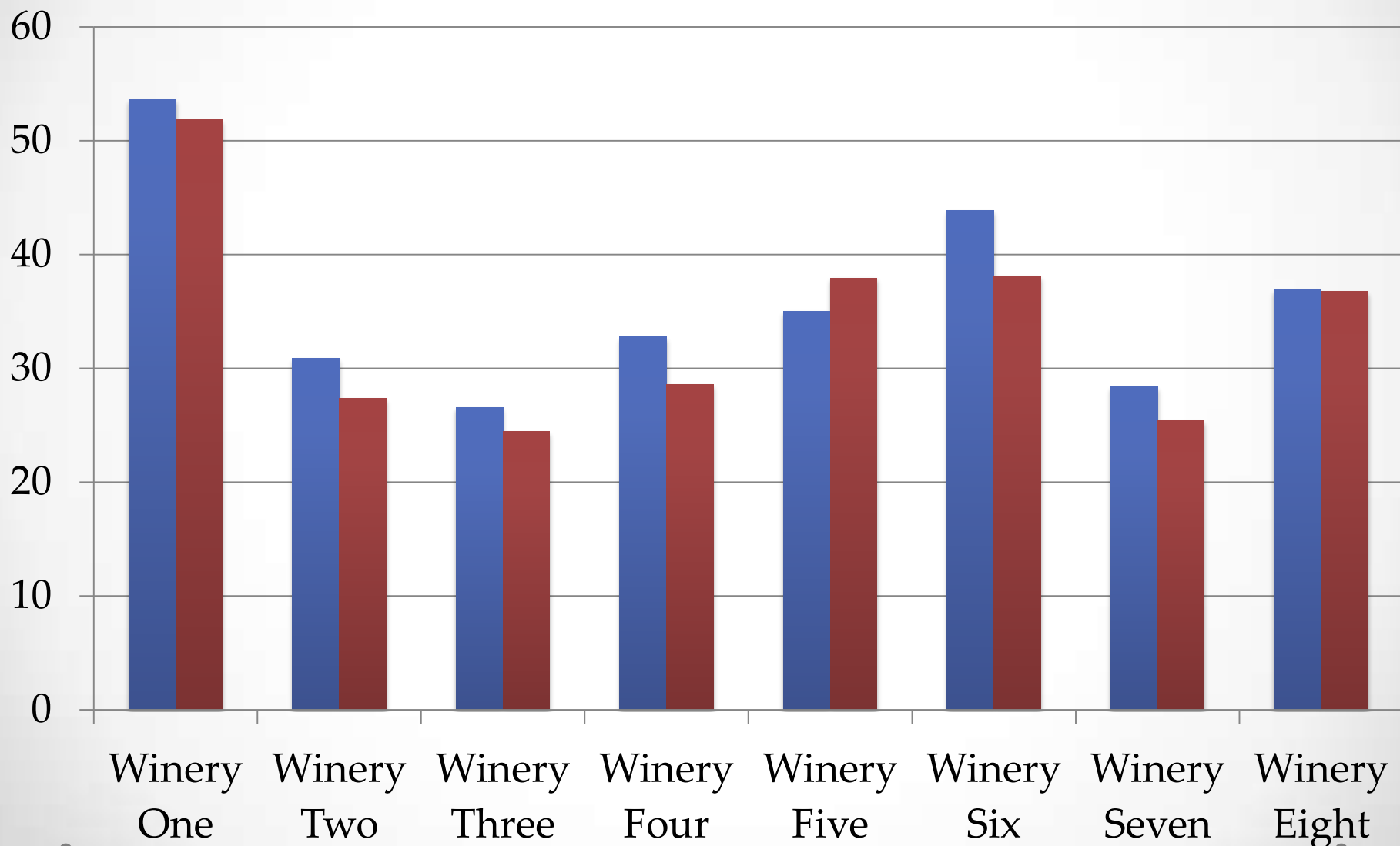
Transfusion



Total Phenolics (AU)

■ Control

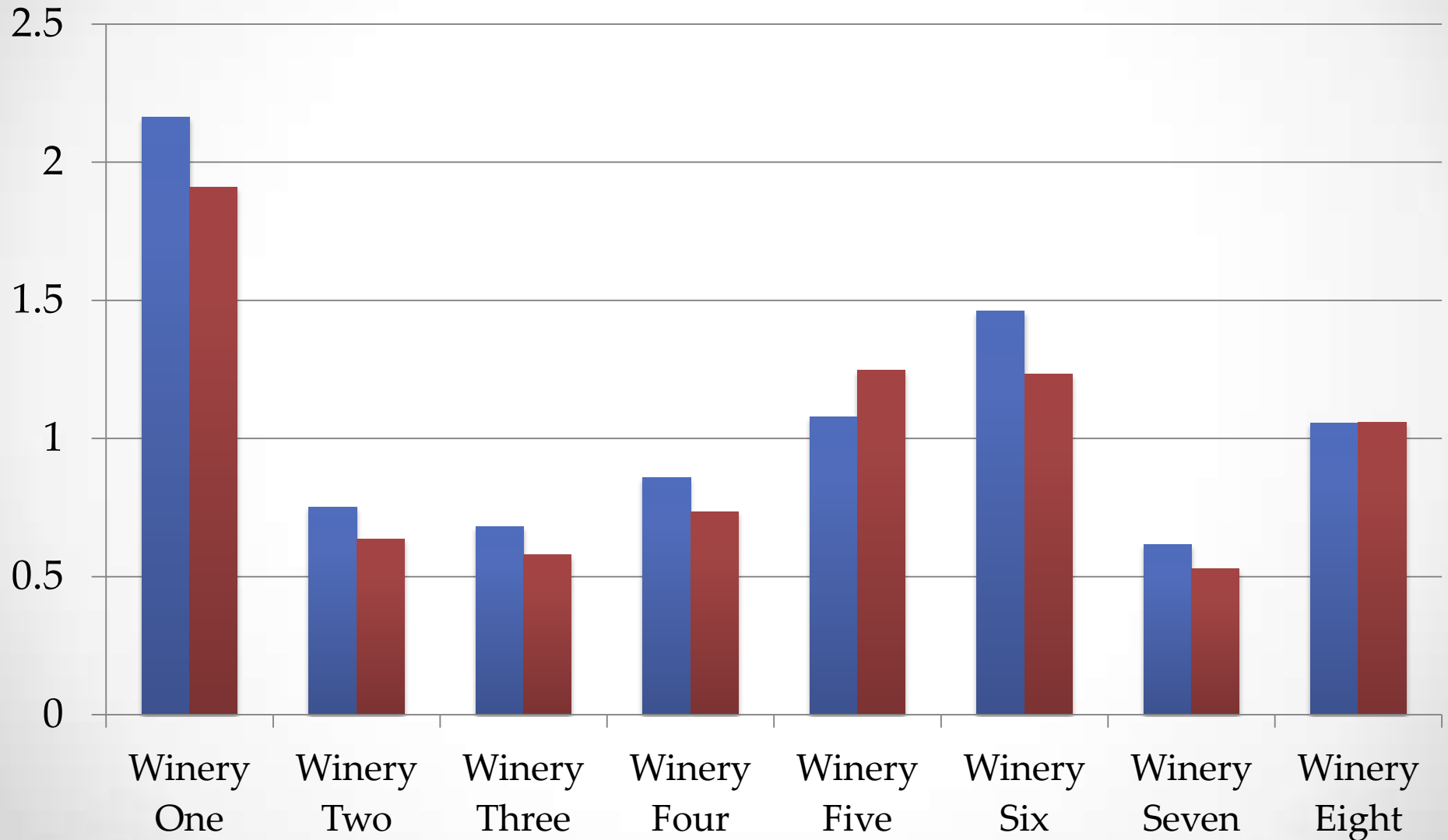
■ Transfusion



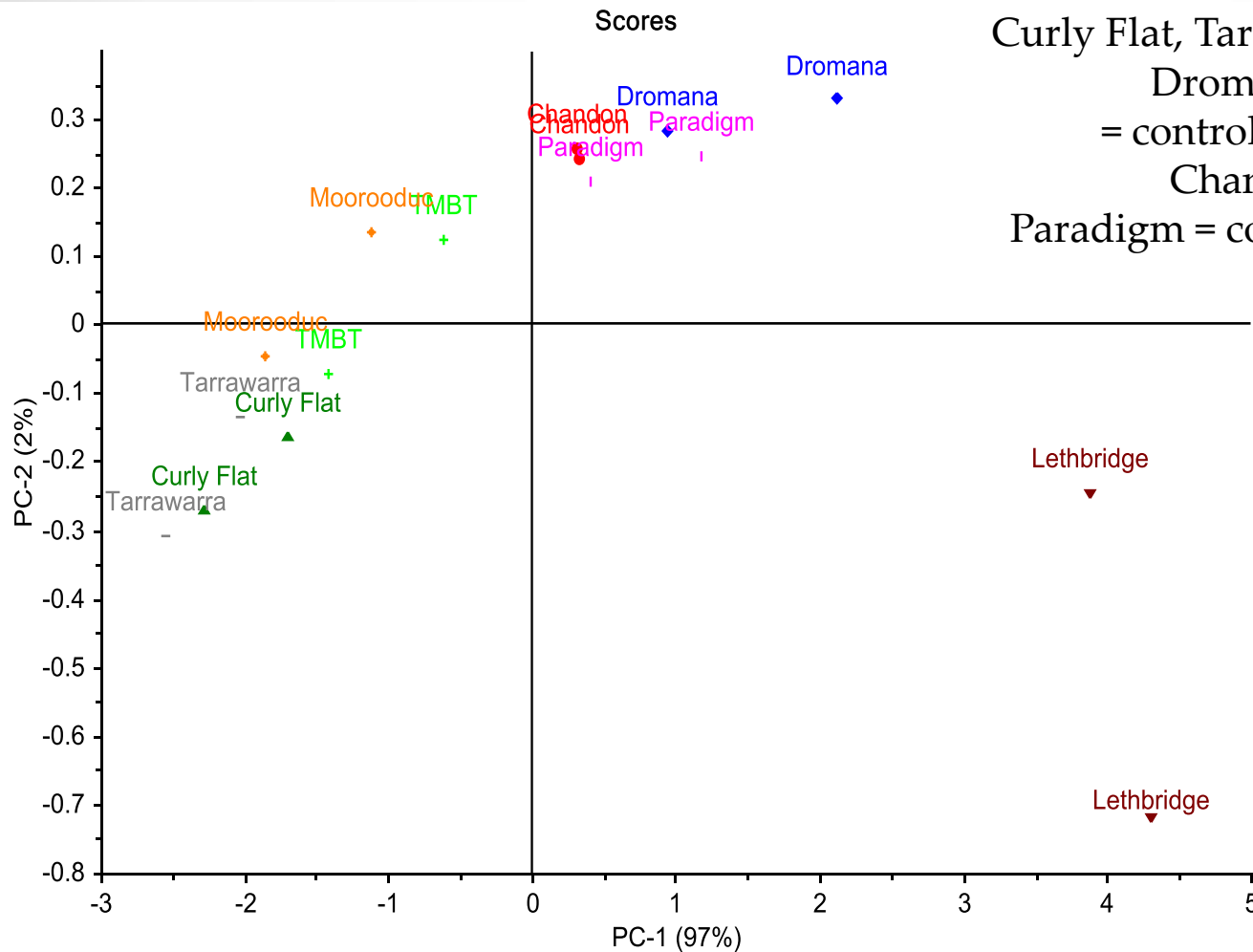
Tannin (g/L)

Control

Transfusion



PCA cluster analysis labelled with winery



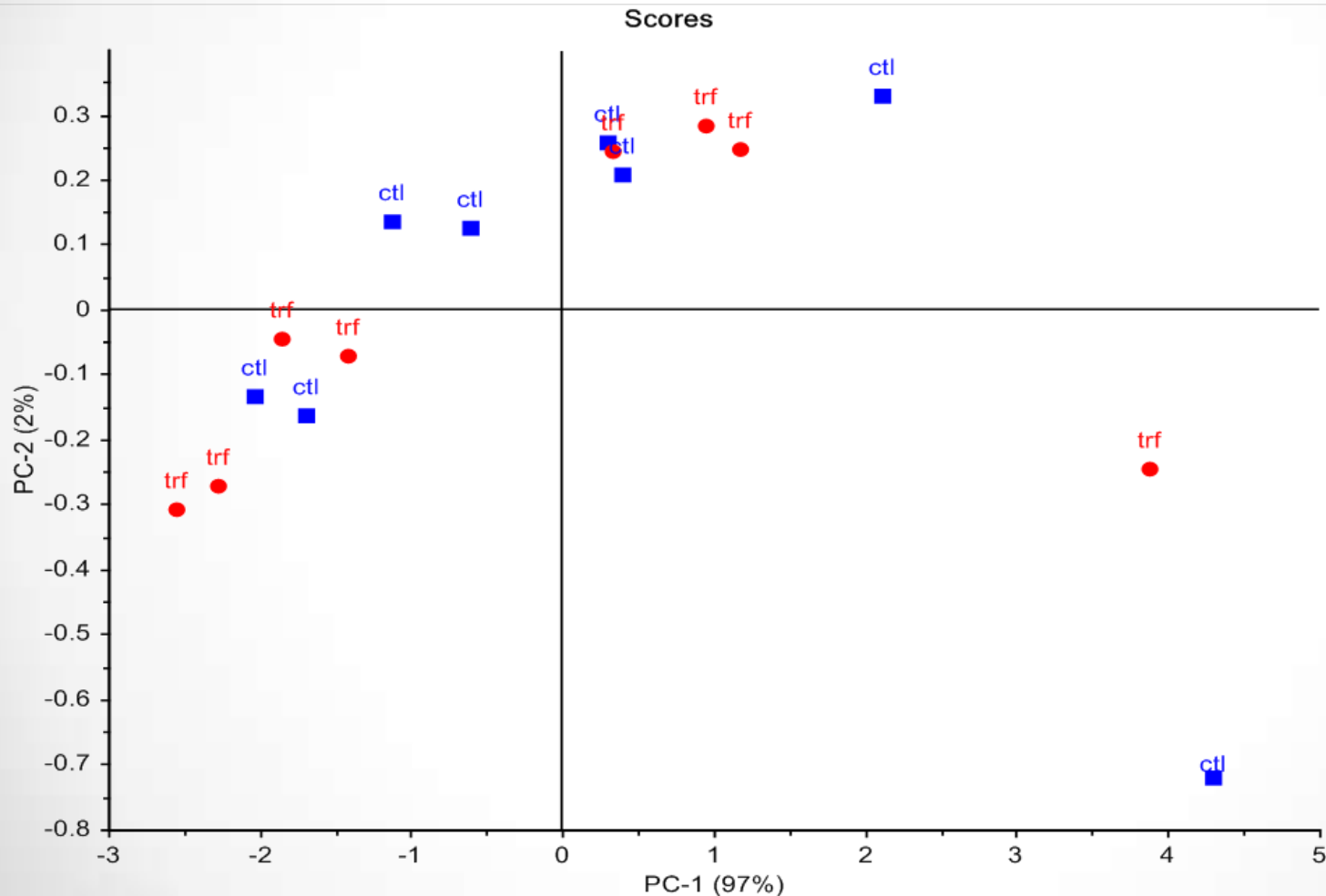
Curly Flat, Tarrawarra, Moorooduc, TMBT,
Dromana and Lethbridge
= control to RHS of transfusion
Chandon = no different
Paradigm = control to LHS of transfusion

Samples near each
other are similar with
regard to **phenolic
profiles**

The further away
from each other the
more different they
are...

RHS placement of the controls for six out of eight is not a significant finding,
but may indicate the **controls** were higher in **total phenolics** than transfusion treatment

PCA cluster analysis labelled with treatment



Conclusions ...

- Transfusion
 - No consistent treatment effect in lab results.
 - Was the transfused volume enough to see an effect?
approx 8% (Bob 20%) (problem with whole berry ferments)



What might have happened?...

Bobs past observations:

Transfusion induced increases in tannin, total phenolics, % non-bleachable pigment (ie higher proportion of pigment as pigmented tannin) and hue (also reflecting conversion of pigment to stable forms).

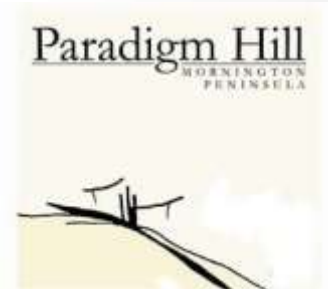
The theory behind this?...

Labile metabolites of active yeast (eg pyruvate and acetaldehyde) may affect extraction and pigment stabilisation.....therefore adding the juice as ferments taper off helps them kick along at a higher rate near the end.

So was an 8% transfusion (similar to chaptalisation) a big enough 'kick'?

Conclusions ...

Conclusions ... If not the lab
..... maybe in the glass?....
Many thanks to ...



Organoleptic assessment

6 (8) wineries

2 wines each

12 glasses

Each of these parameters are to be scored...

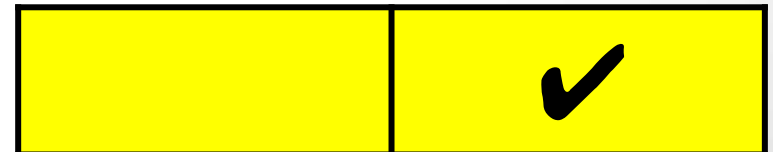
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- **e. palate length**

1 = low
2
3
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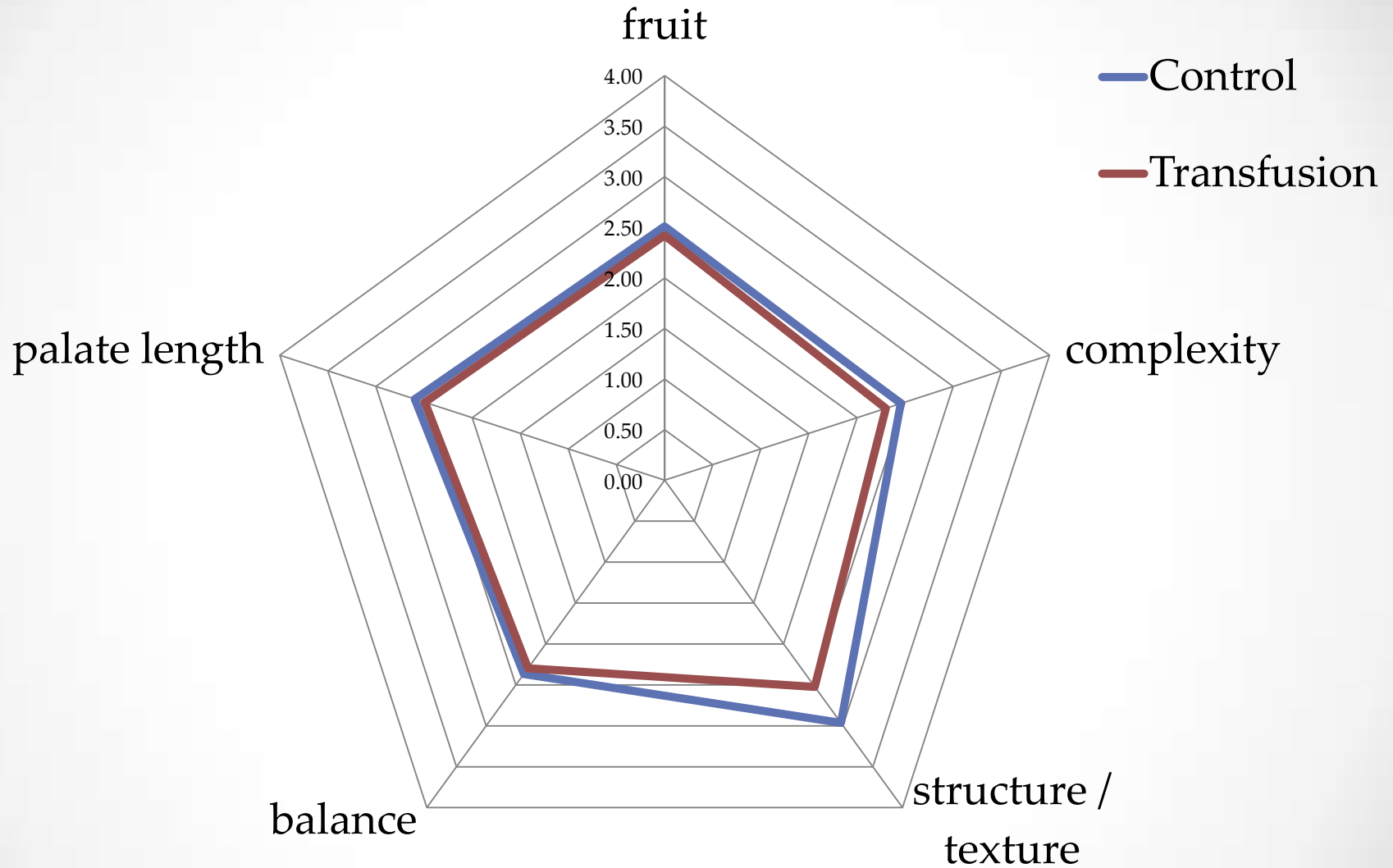
Can you detect any difference between the 2 wines (pair)

YES or NO

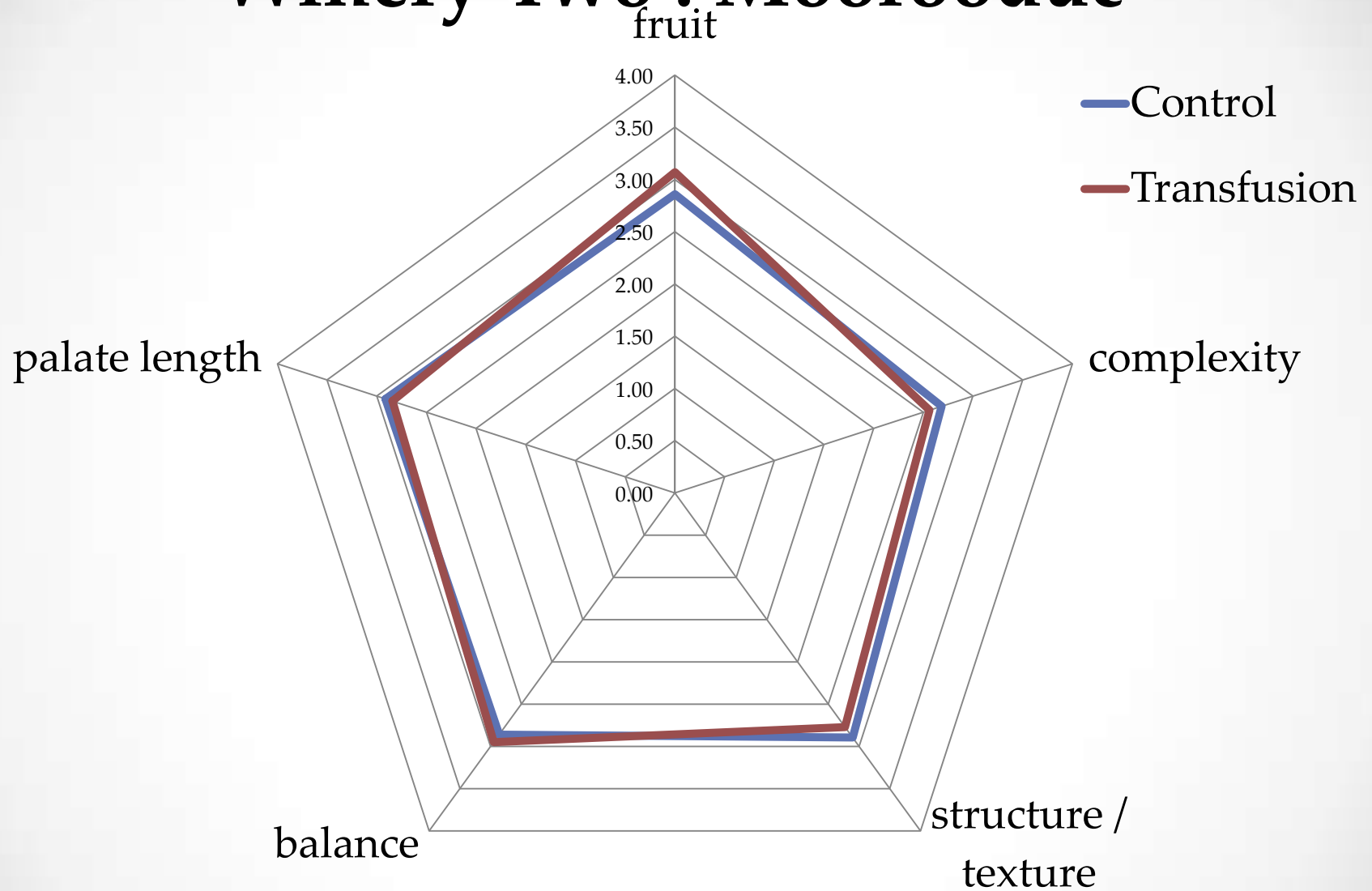
For each winery, which wine do you prefer...



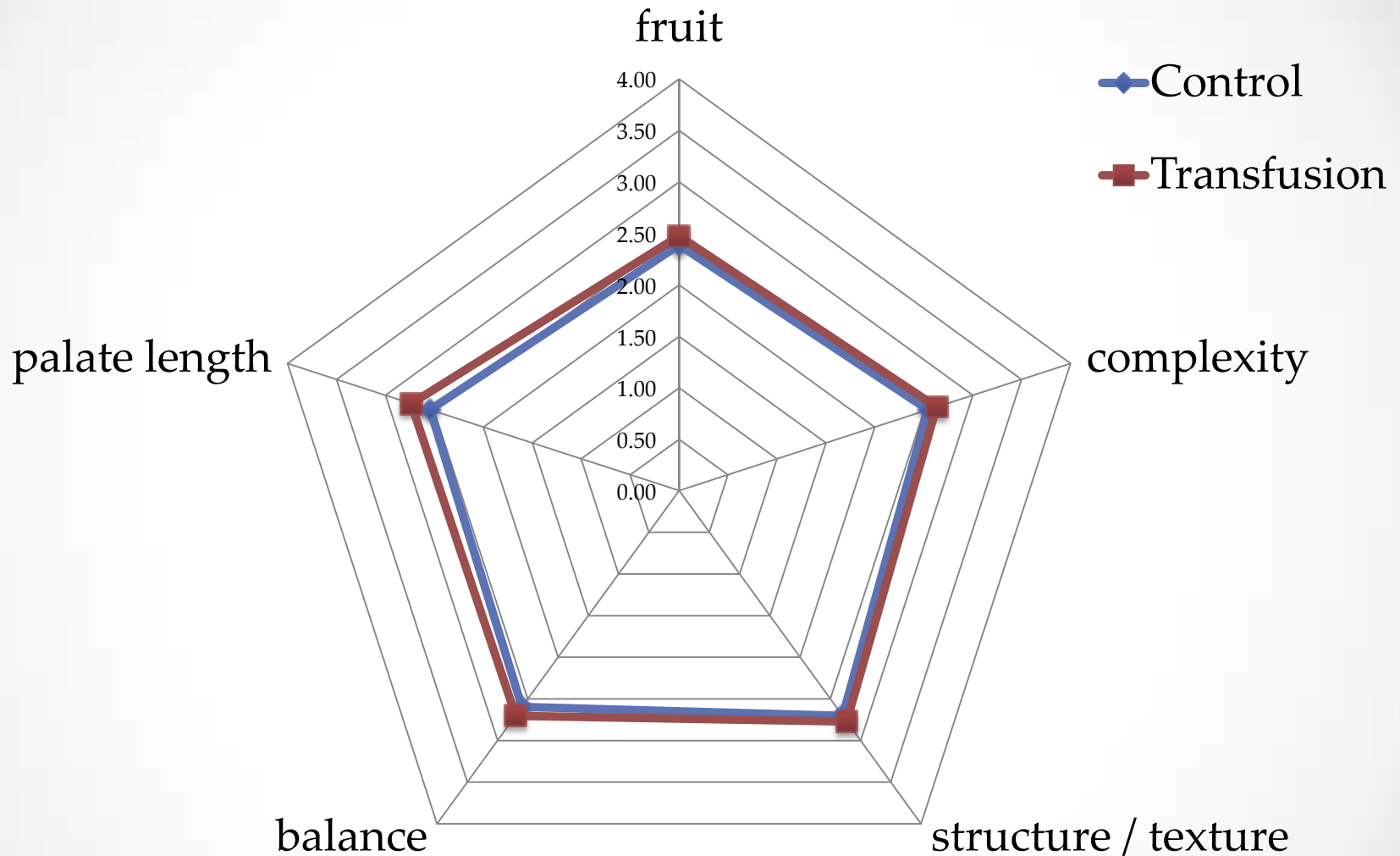
Winery One : Lethbridge



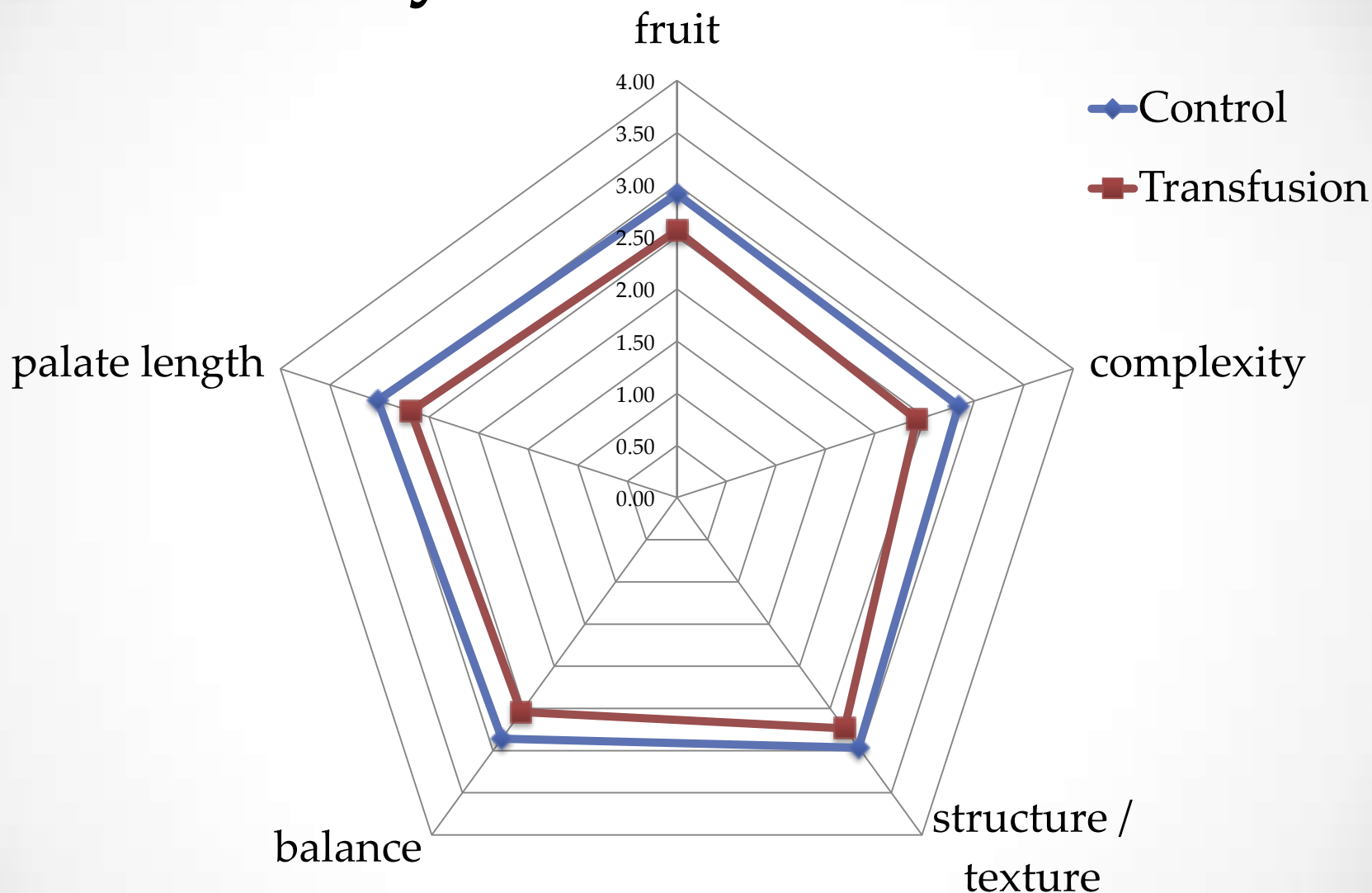
Winery Two : Moorooduc



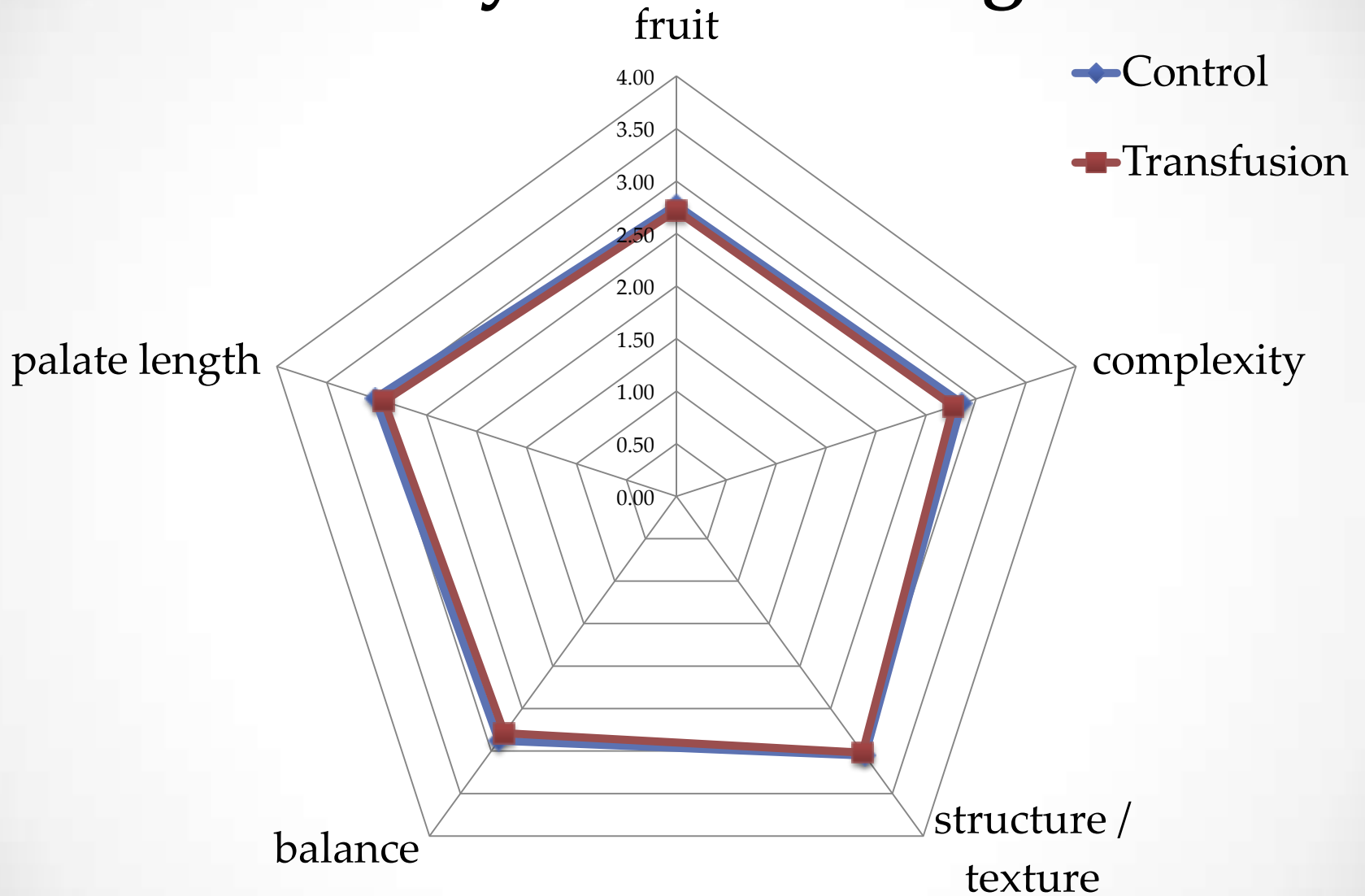
Winery Three : Curly Flat



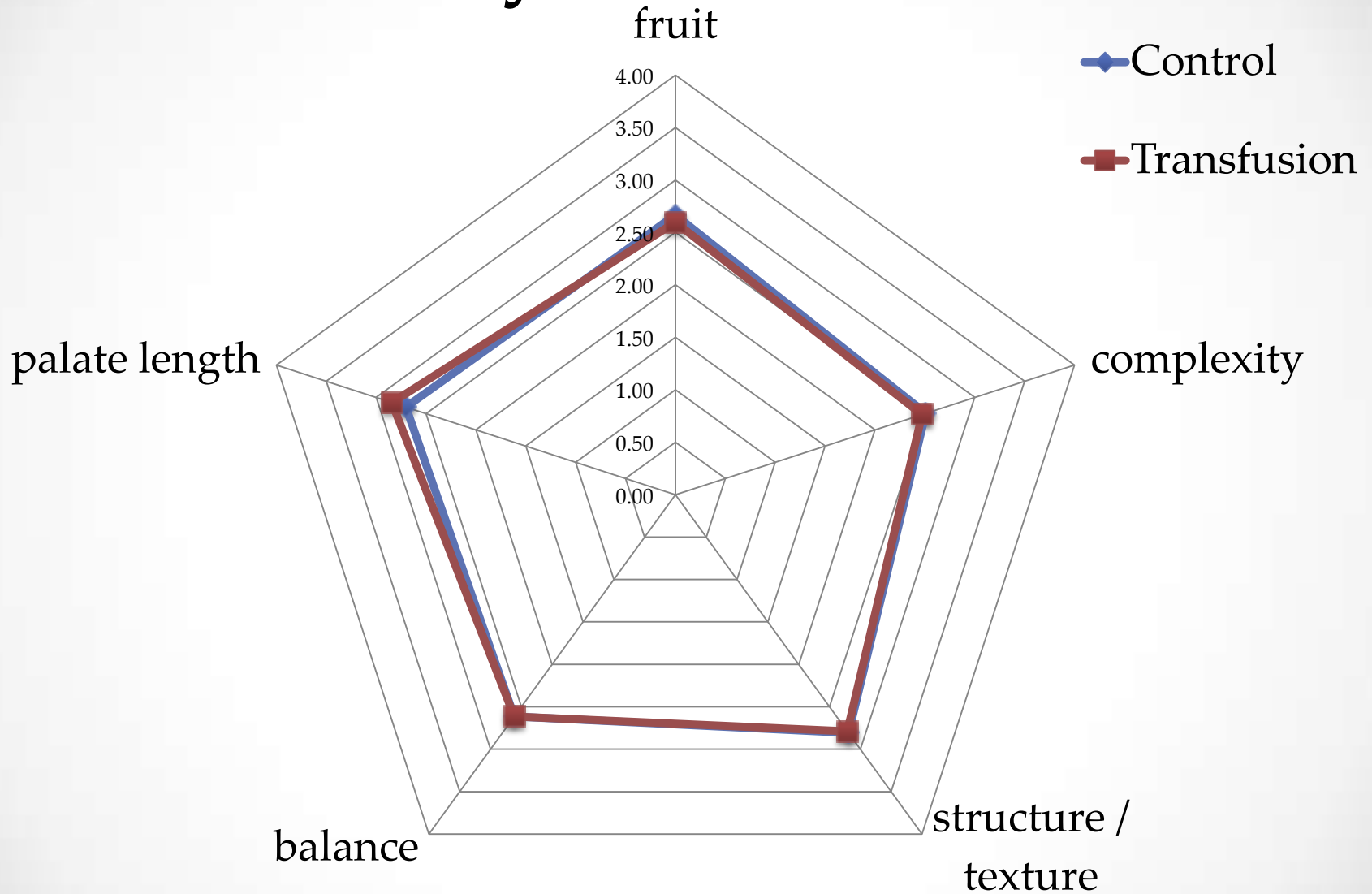
Winery Four : Ten Minutes



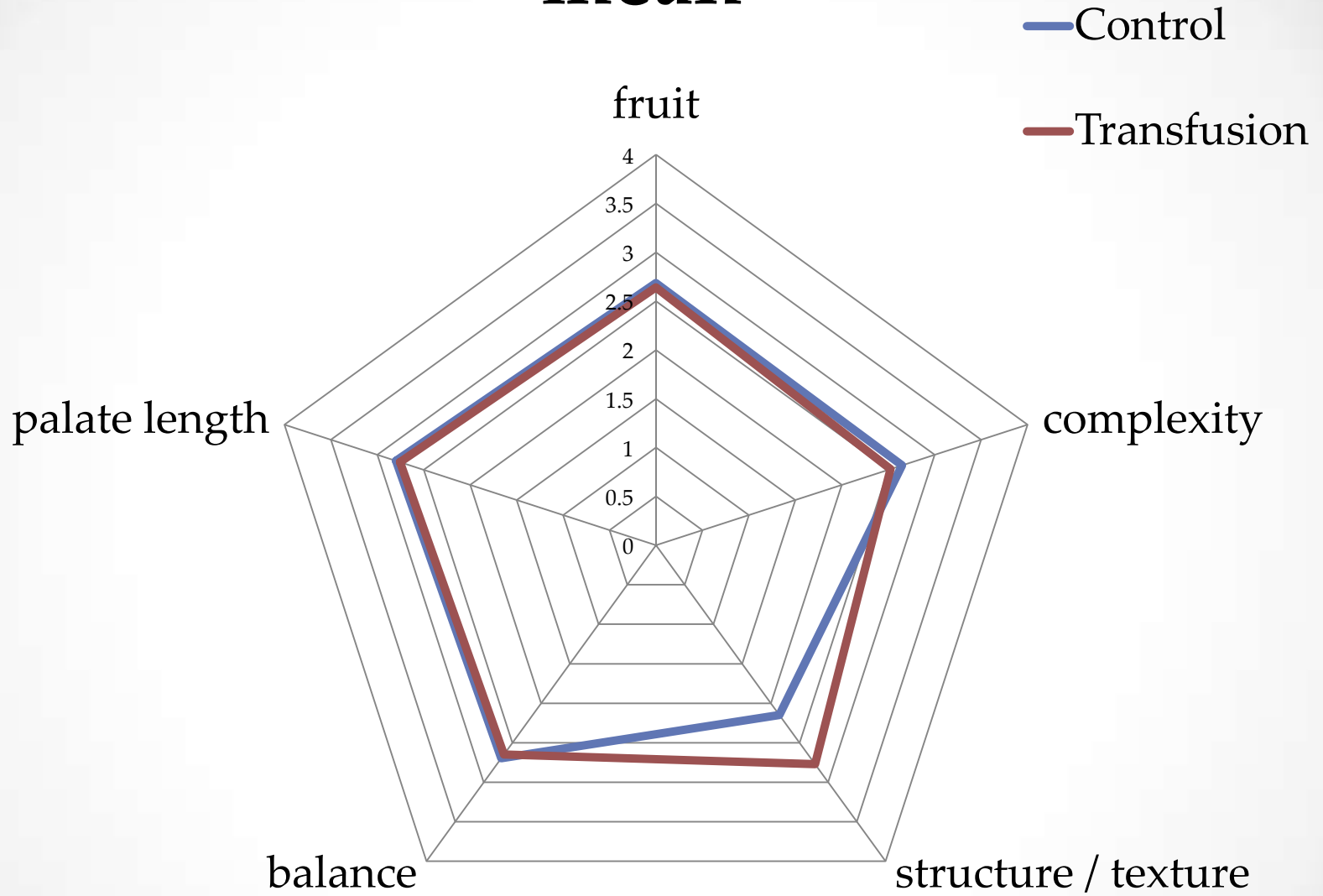
Winery Five : Paradigm



Winery Six : Dromana

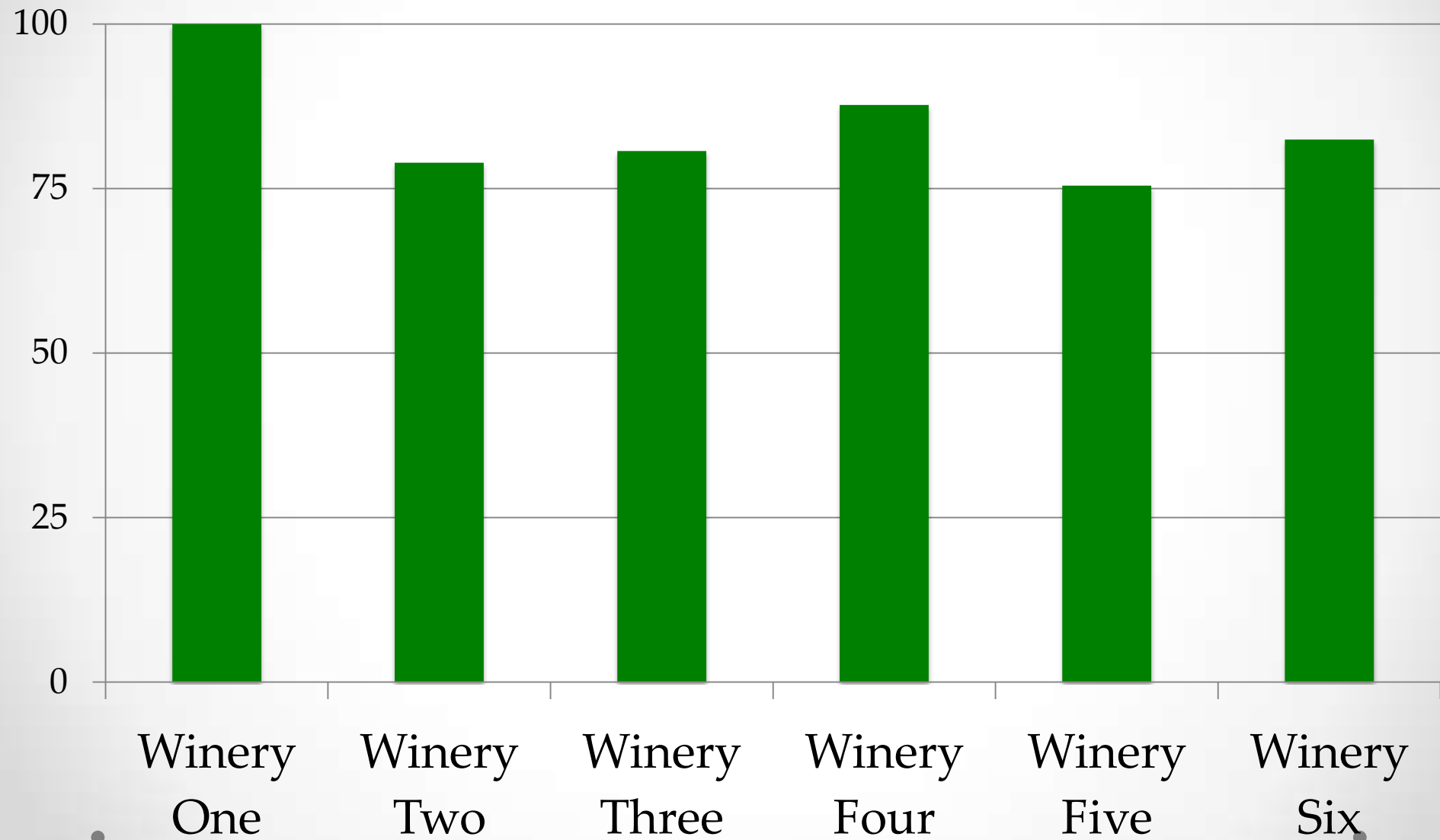


mean



Difference perceived...

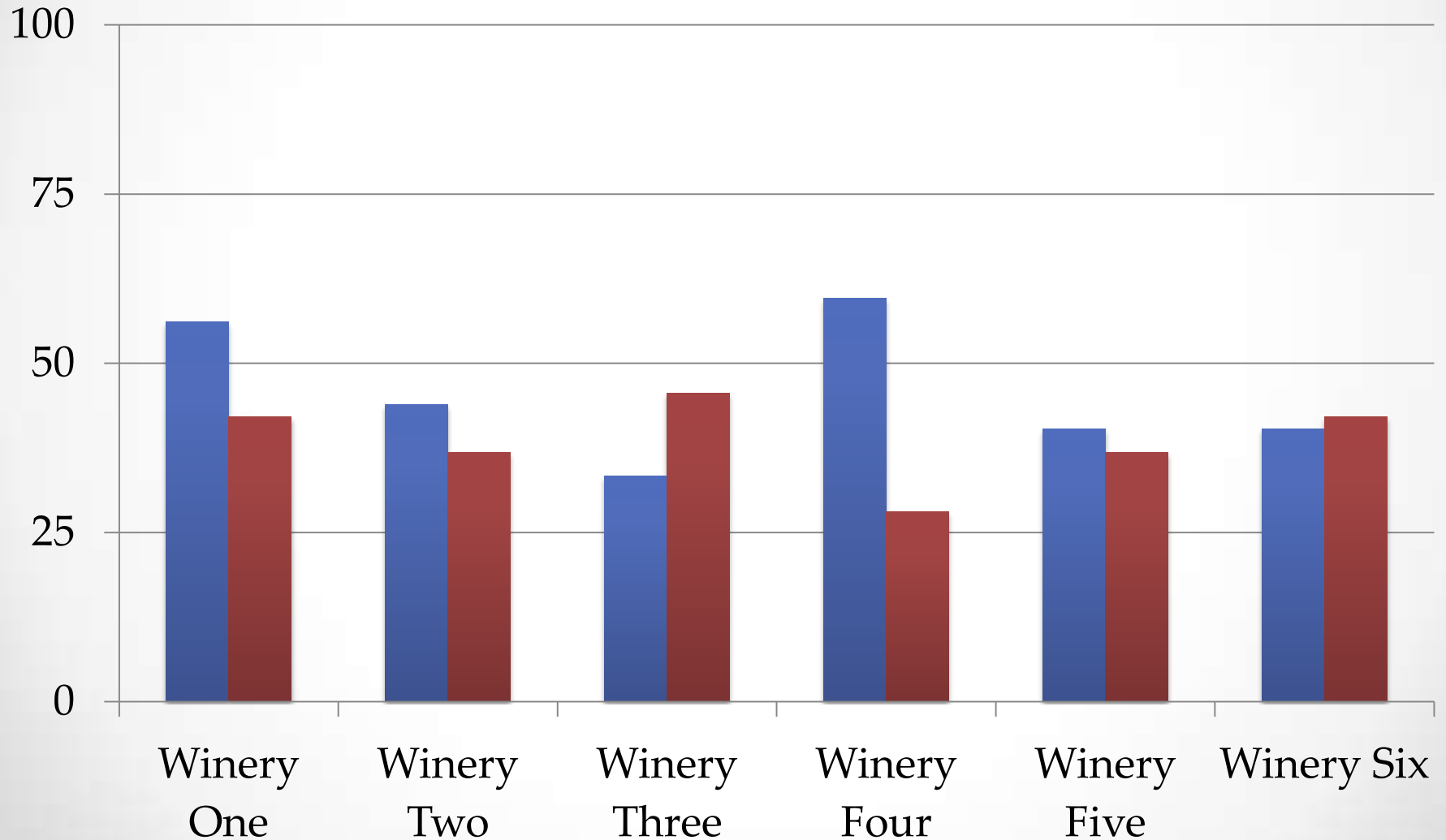
■ YES (%)



Preferred wine (%)

Control

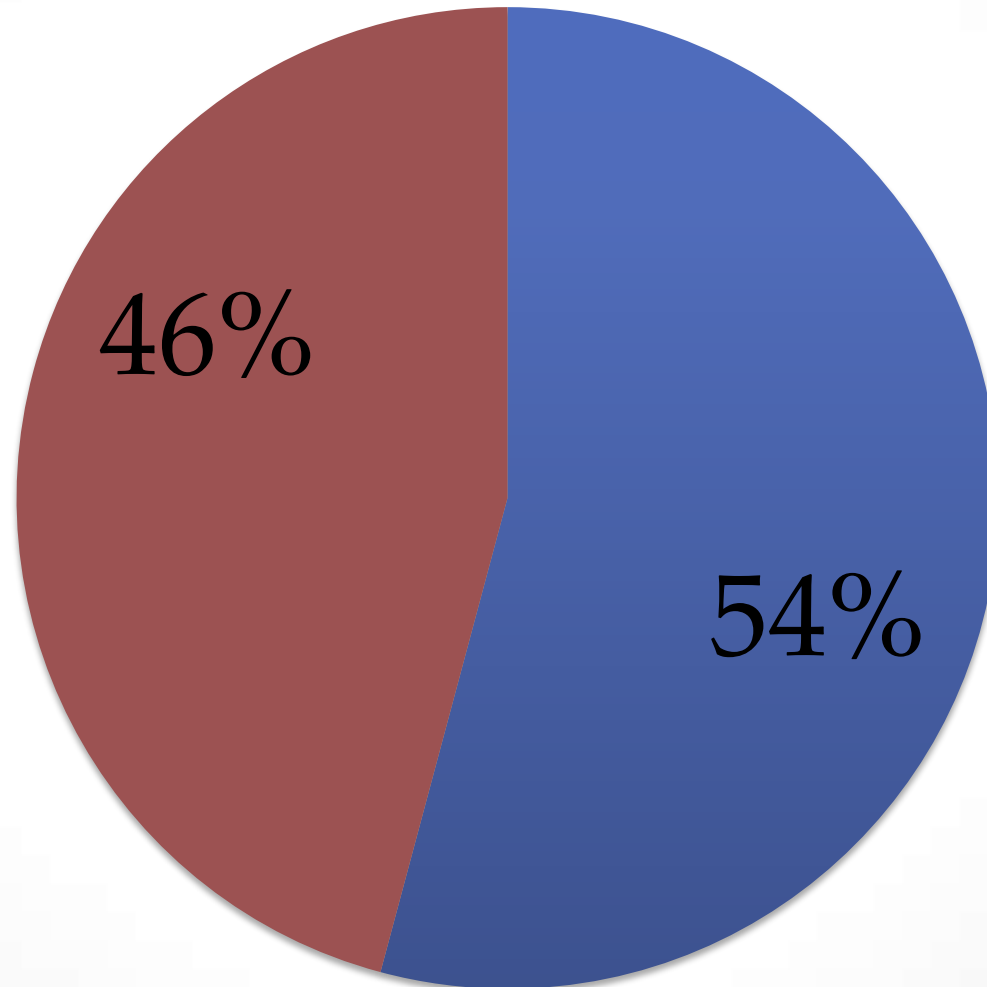
Transfusion



Preferred wine

■ Control

■ Transfusion



Conclusions ... ?

- Was the transfused volume enough to see an effect?
- approx 8% (Bob 20%) (problem with whole berry ferments)

EXTREME TRANSFUSION

Initial idea...



- VPNW 2013 : Transfusion = 8%
 - VPNW 2013 : Conclusion = Failed to see an effect
 - Enter George and the pilot study VPNW 2014:

so lets make it bigger ...



- VPNW 2014 = **Extreme transfusion = 20%**
 - Same methodology
 - Larger juice fraction removed
 - Juice returned at conclusion of ferment (five aliquots)

Transfusion procedure...

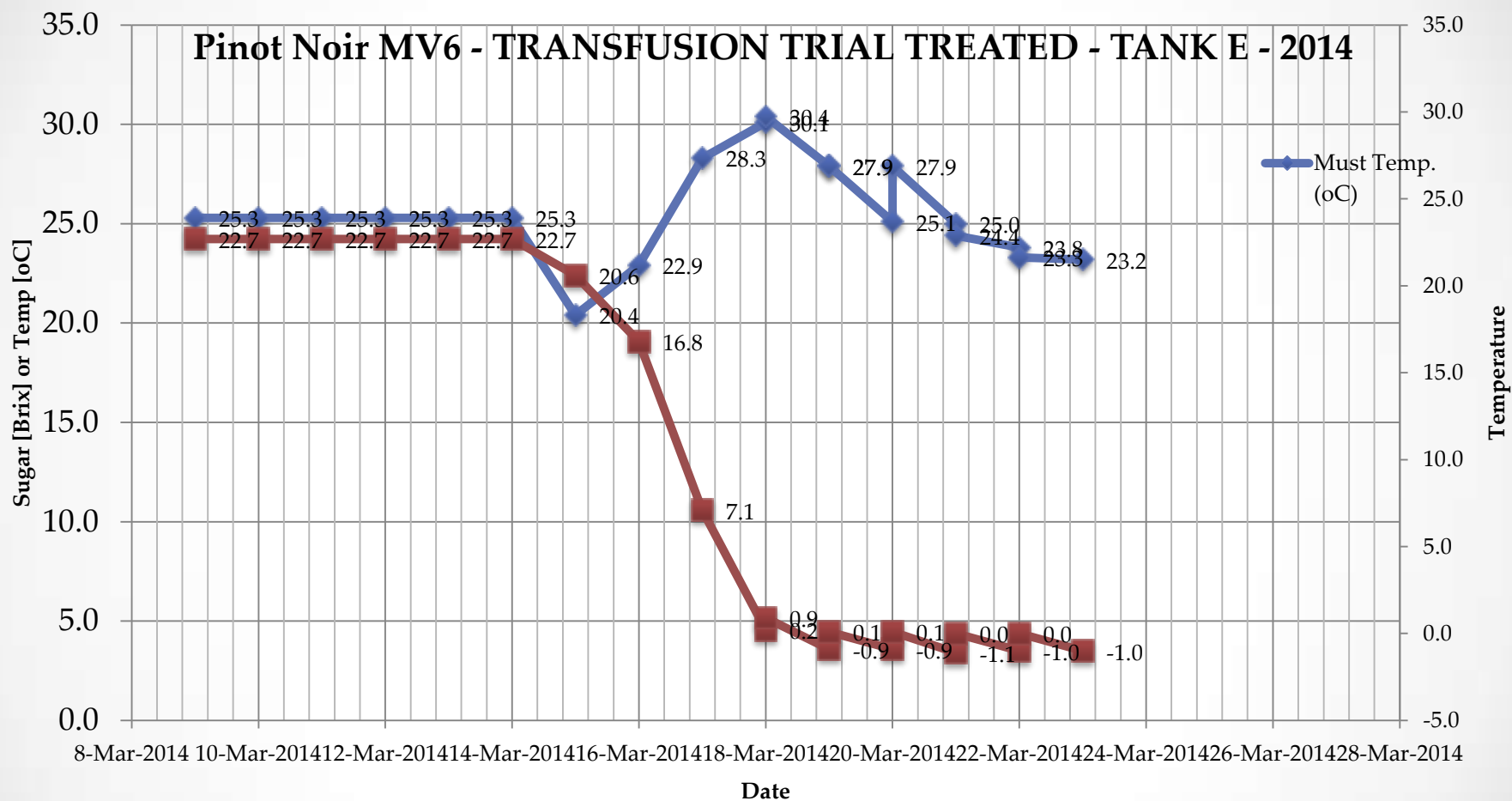
Vat 1 = 1000 kg fruit = 700 L juice

Calc:

2 baumé = 109.6 L @ 12.8 baumé)



Refrigerate at 4°C to inhibit fermentation of "transfusion juice".



Conclusions ...

- No effect on pH : TA

- X-Transfusion = “slightly” :
 - higher alc%
 - less glycerol
 - less residual glucose

- X-Transfusion = **LESS** :
 - colour density
 - free anthocyanin
 - pigmented tannin
 - pigment
 - total phenolics
 - tannin
 - less everything



So what was the effect of increased skin:juice ratio during the ferment (pre-transfusion) ?

Thank you ...

