

ACE

Manipulation of wine phenolics during winemaking

Dr Angela Sparrow, Tasmania, Australia

with modest contributions from Richard Smart



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Vinventive

Dr Angela Sparrow, and ACE/DTMA by Della Toffola

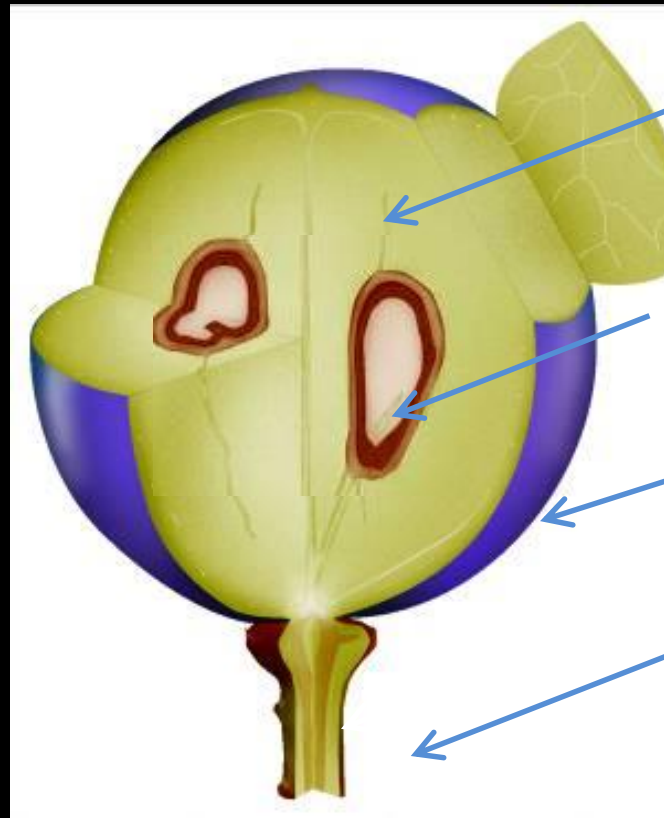


texture

colour

flavour

Pinot Noir



Pulp

Seed

Skin

Stalk

ACE maceration

ACE = Accentuated Cut Edges

**CRUSHED GRAPES =
FLATTENED SPHERES**

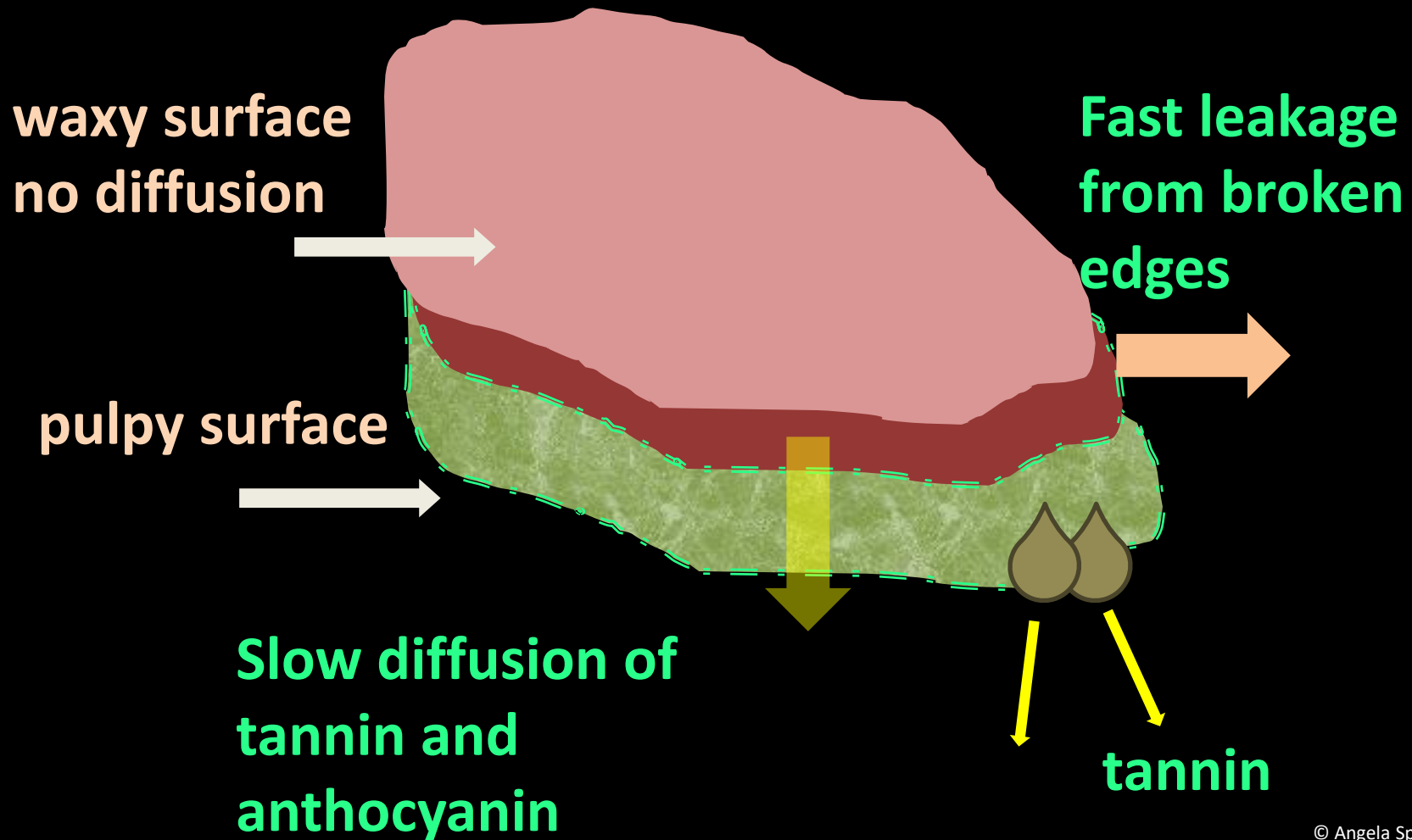
limited broken edges

flattened berries, 12 fragments
only.

Pinot Gris, Bucher Vaslin
Crusher/de-stemmer.



Grape skin fragment



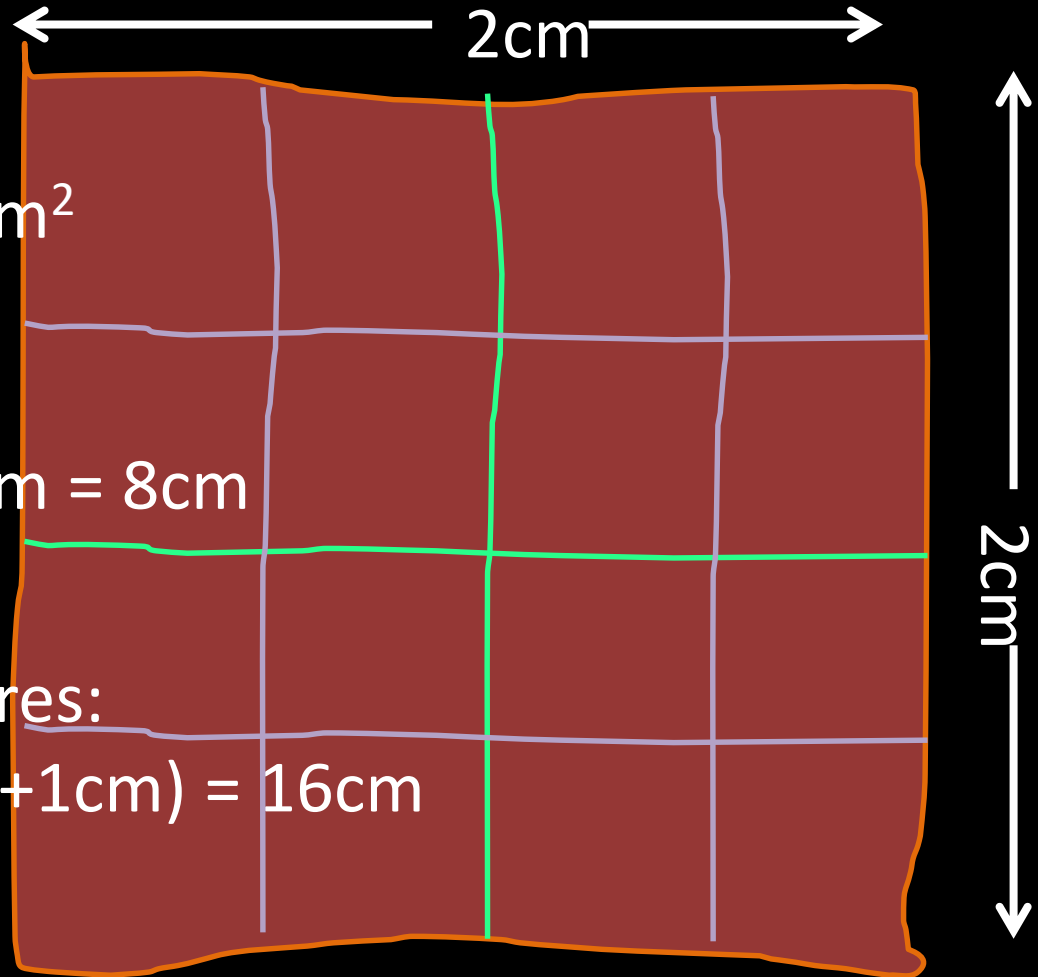
ACE SKIN FRAGMENTATION

Area = $2\text{cm} \times 2\text{cm} = 4\text{cm}^2$

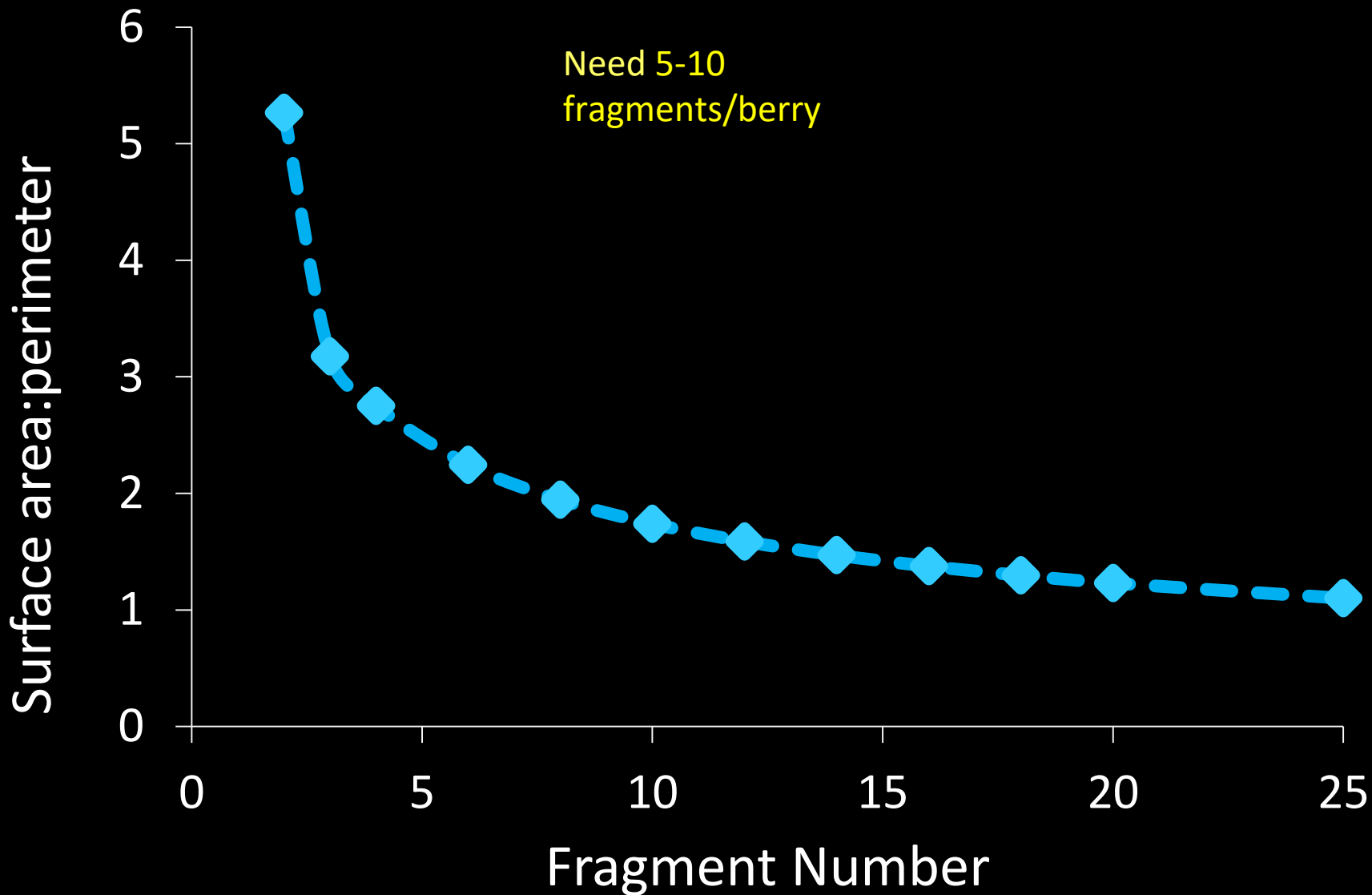
Edge length of square:
 $= 2\text{cm} + 2\text{cm} + 2\text{cm} + 2\text{cm} = 8\text{cm}$

Edge length small squares:
 $= 4 \times (1\text{cm} + 1\text{cm} + 1\text{cm} + 1\text{cm}) = 16\text{cm}$

Cut again:
 $= 16 \times (0.5\text{cm} + 0.5\text{cm} + 0.5\text{cm} + 0.5\text{cm}) = 32\text{cm}$

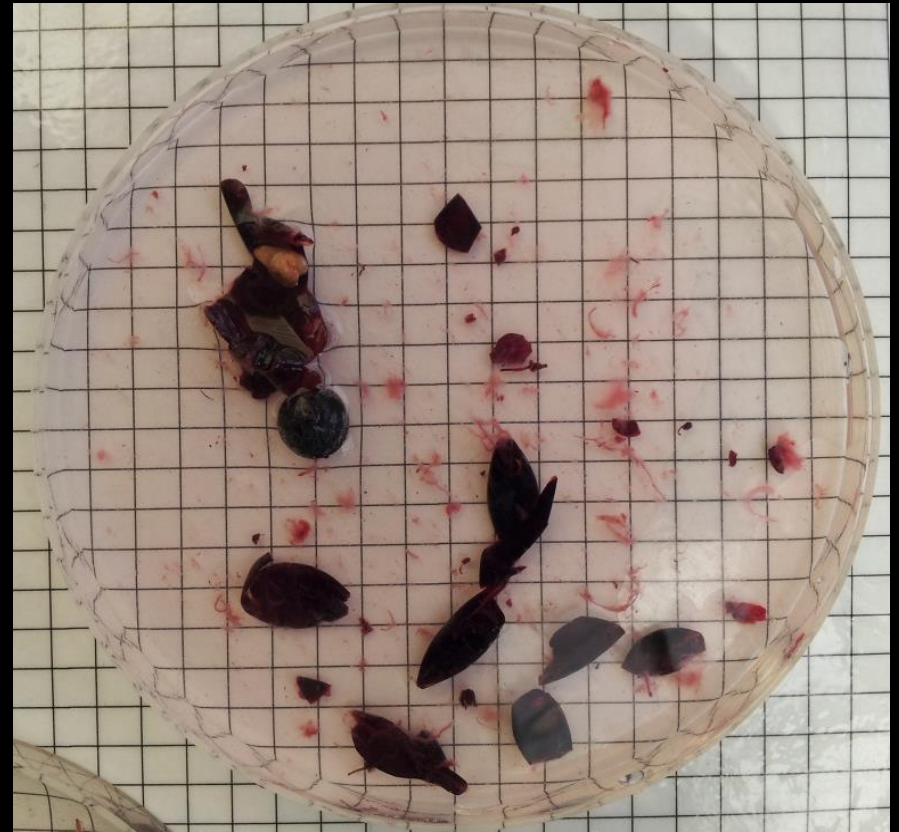


Fragmentation Effect





Control



**ACE smaller
fragments, more
colour**

Factors affecting extraction of phenolic compounds during red wine maceration* ...

Extraction of phenolics from solids (skins and seeds) via two mechanisms:

- Instantaneous initial leakage from broken skin edge...
- Much slower concentration-driven diffusion across solid layer (pulp) during maceration

Factors affecting extraction and evolution of phenolic compounds during red wine maceration and the role of process modelling. Setford et al (2017), Trends in Food Science and Technology 69, 106-117

Methods to achieve skin fragmentation

ACE/DTMA.....inexpensive, mobile, versatile, low energy

PECTOLYTIC ENZYMES

And the rest require much energy, and money \$\$\$\$\$\$.....

HEATING (Flash détente) 95 °C plus vacuum

MICROWAVE 70 °C.

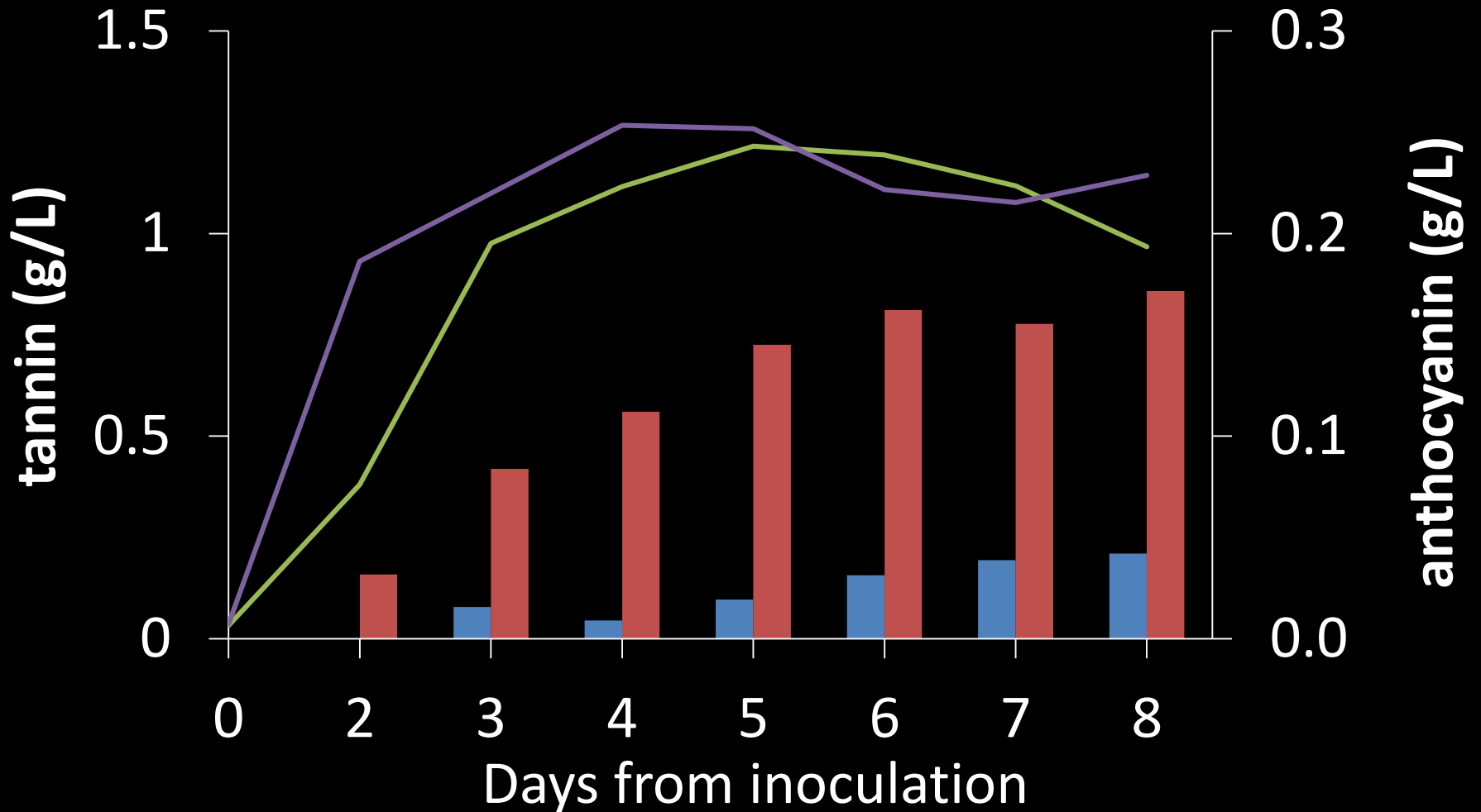
COOLING ...must freezing, cell membranes disrupted

ULTRASOUND ASSISTED EXTRACTION UAE

PULSED ELECTRIC FIELD PEF

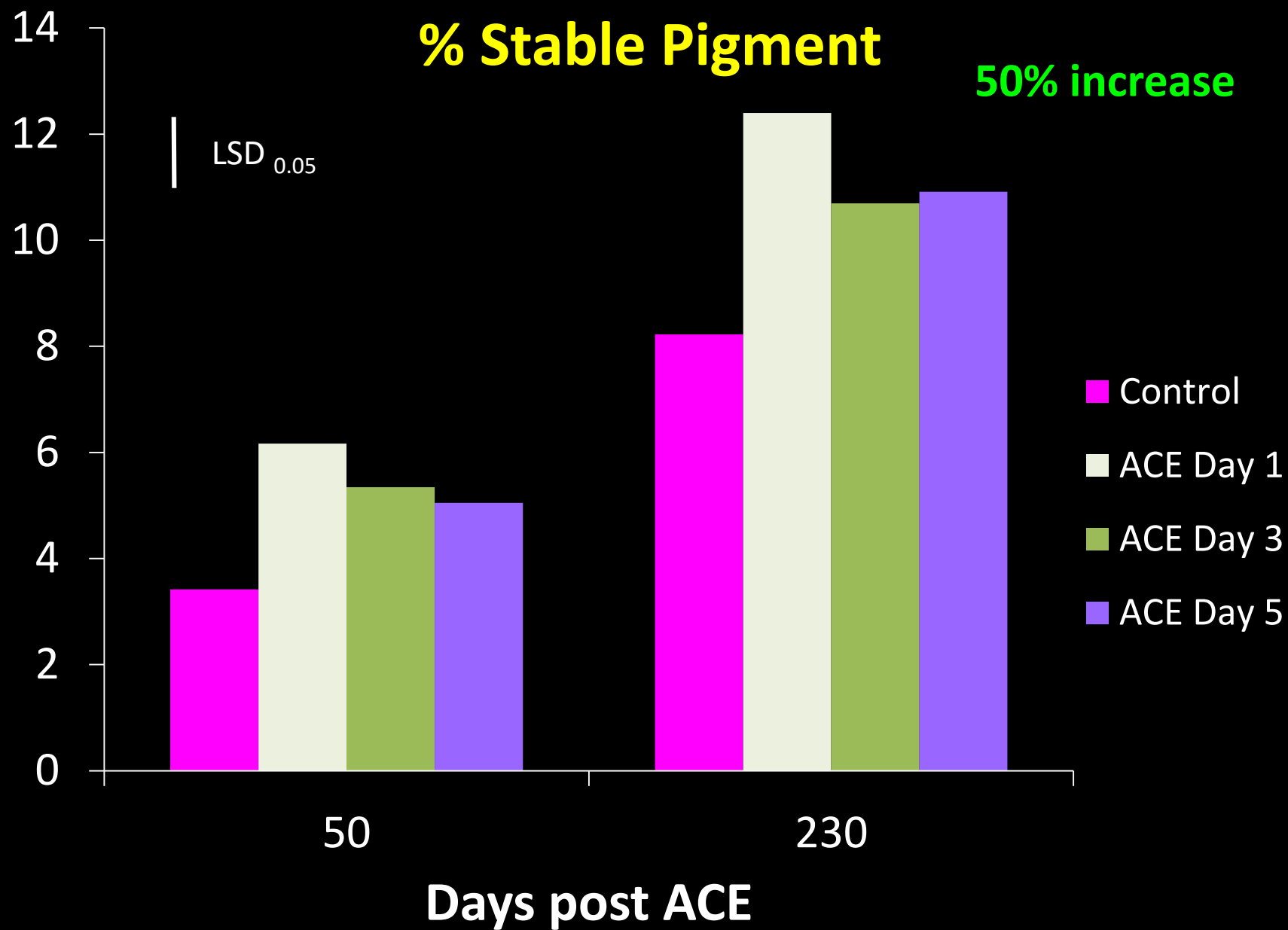
When should ACE be applied?

Tannin & Pigment Extraction



■ Conventional tannin
— Conventional pigment

■ ACE tannin
— ACE pigment



Press early ... ? days after cutting

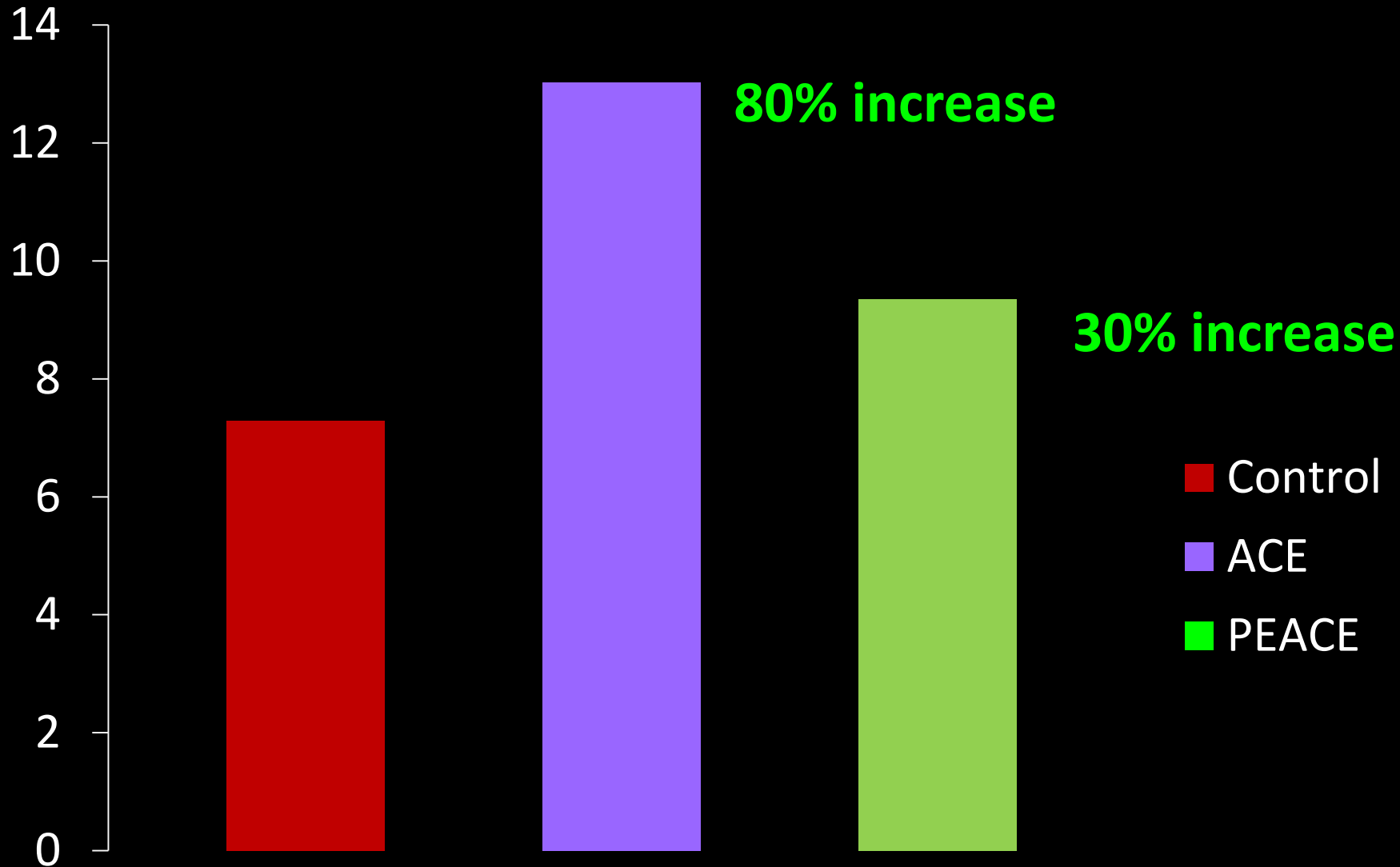


Press Early, ACE

= PEACE

Cap depth 40%

% Stable Pigment



230 Days post ACE



Sensory evaluation at 230 days

- Hue
- Colour Density
- Aroma (floral/red fruit/dark fruit)
- Palate (red fruit/dark fruit)
- Structure /texture
- Balance
- Palate length
- Tannin
- Could you detect a difference?
- Which did you prefer?

Sensory summary

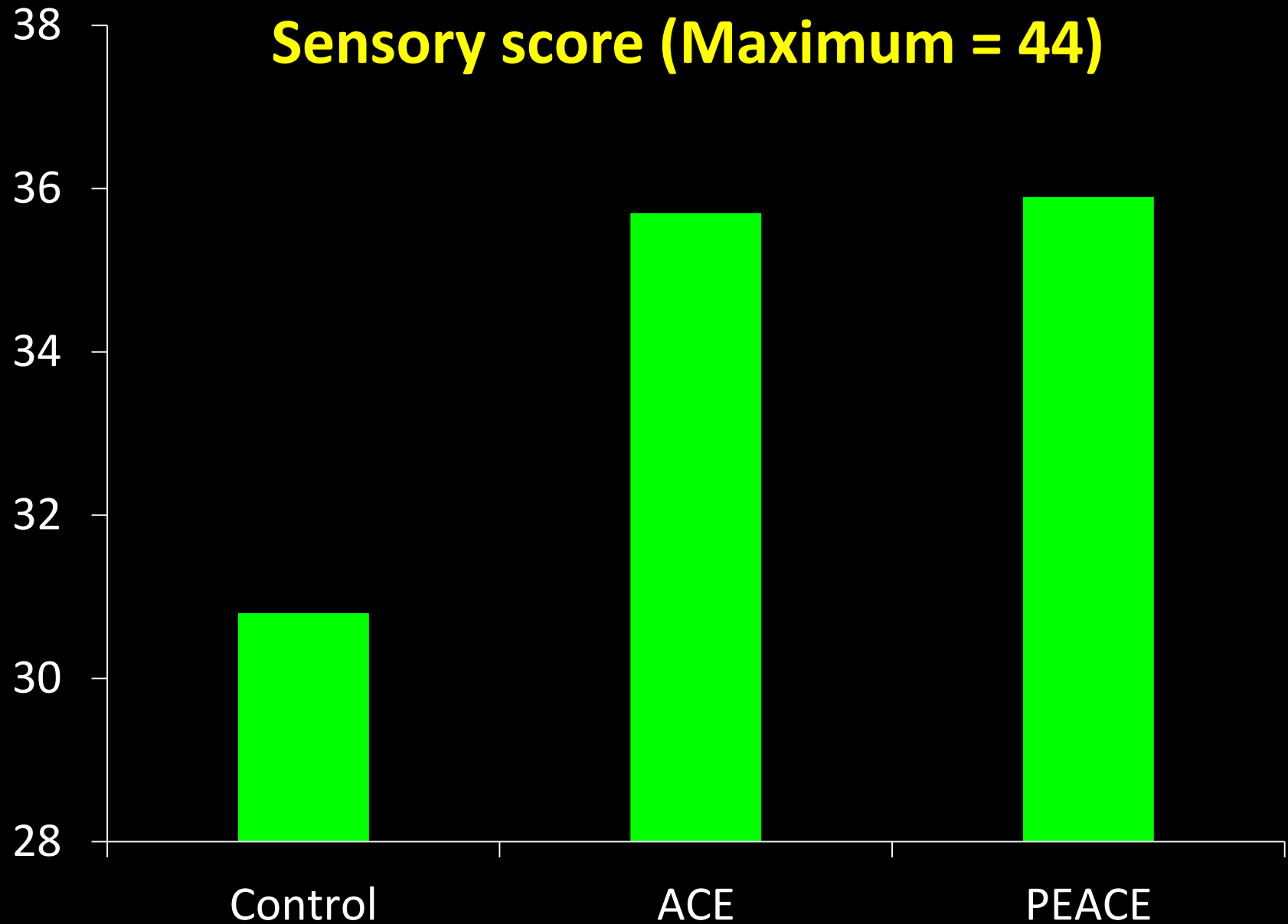
- Could you detect a difference?

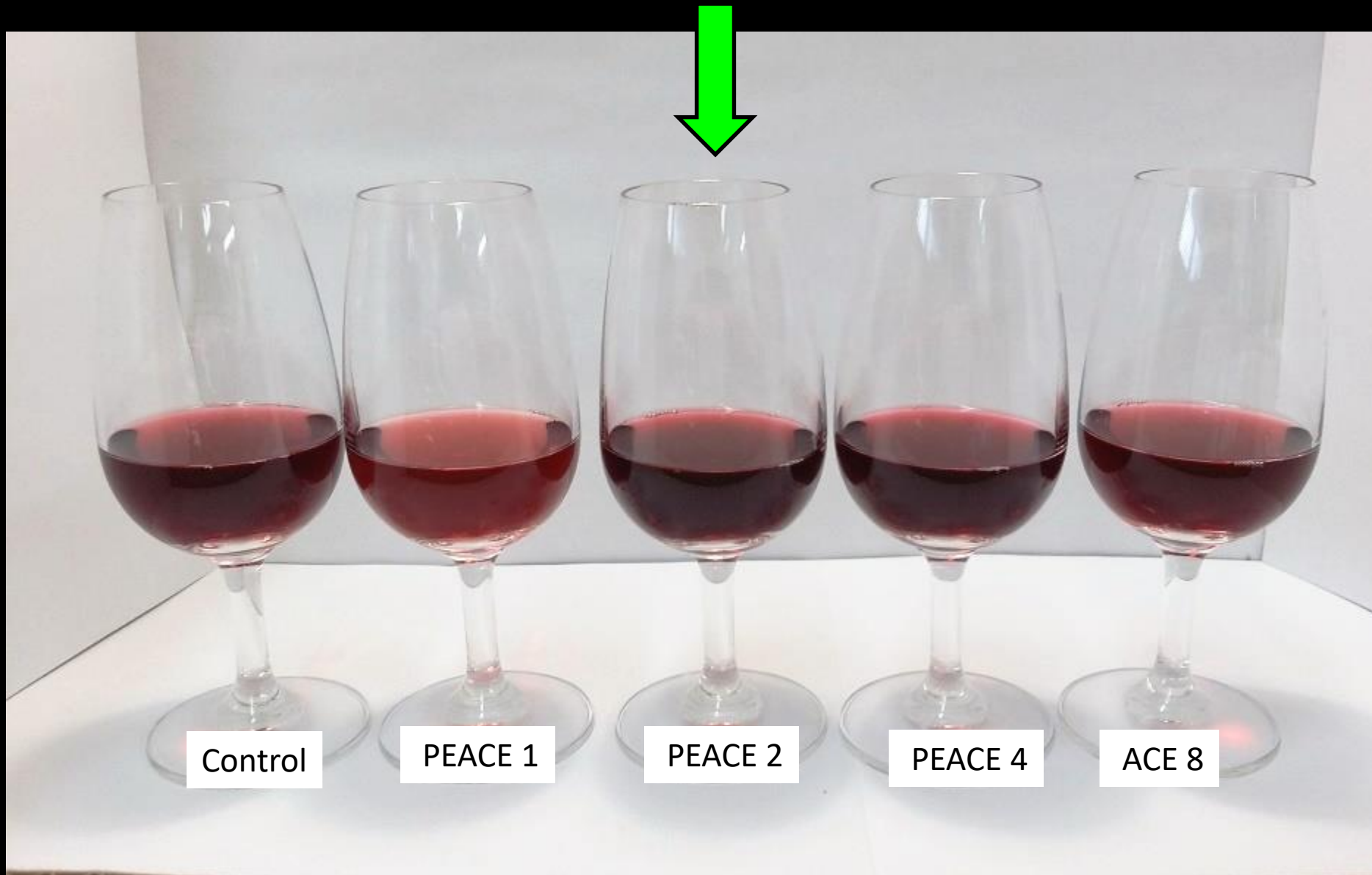
YES = 100%

- Which did you prefer?

ACE/PEACE = 90%

Sensory score (Maximum = 44)





Poll question	PEACE	ACE	Control
Which wine appears darker?	2	27	18
Which wine has the most red fruit aromas and flavors?	29	13	9
Which wine has the most dark fruit aromas and flavors?	9	25	18
Which wine has the firmest tannins?	8	15	26
Which wine has the smoothest tannins?	21	15	13
Which is your preferred style of wine?	23	19	7

HOW YOU CAN SIMPLY EVALUATE ACE
A stick blender, see Robot coupe



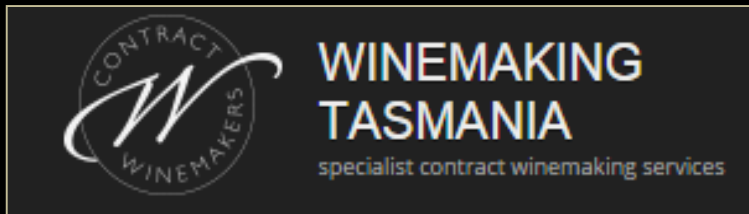


Why choose ACE?

- **Adaptable**
- **Mobile**
- **Inexpensive**
- **Energy saving**
- **Space saving**
- **Labour saving**
- **Better wine quality*******



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