

New theory and research on tannins, proteins and their relationship to color stabilization and sensory effects in red wine

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New Red Wine Paradox?

Apparent disagreement between academics and manufacturers

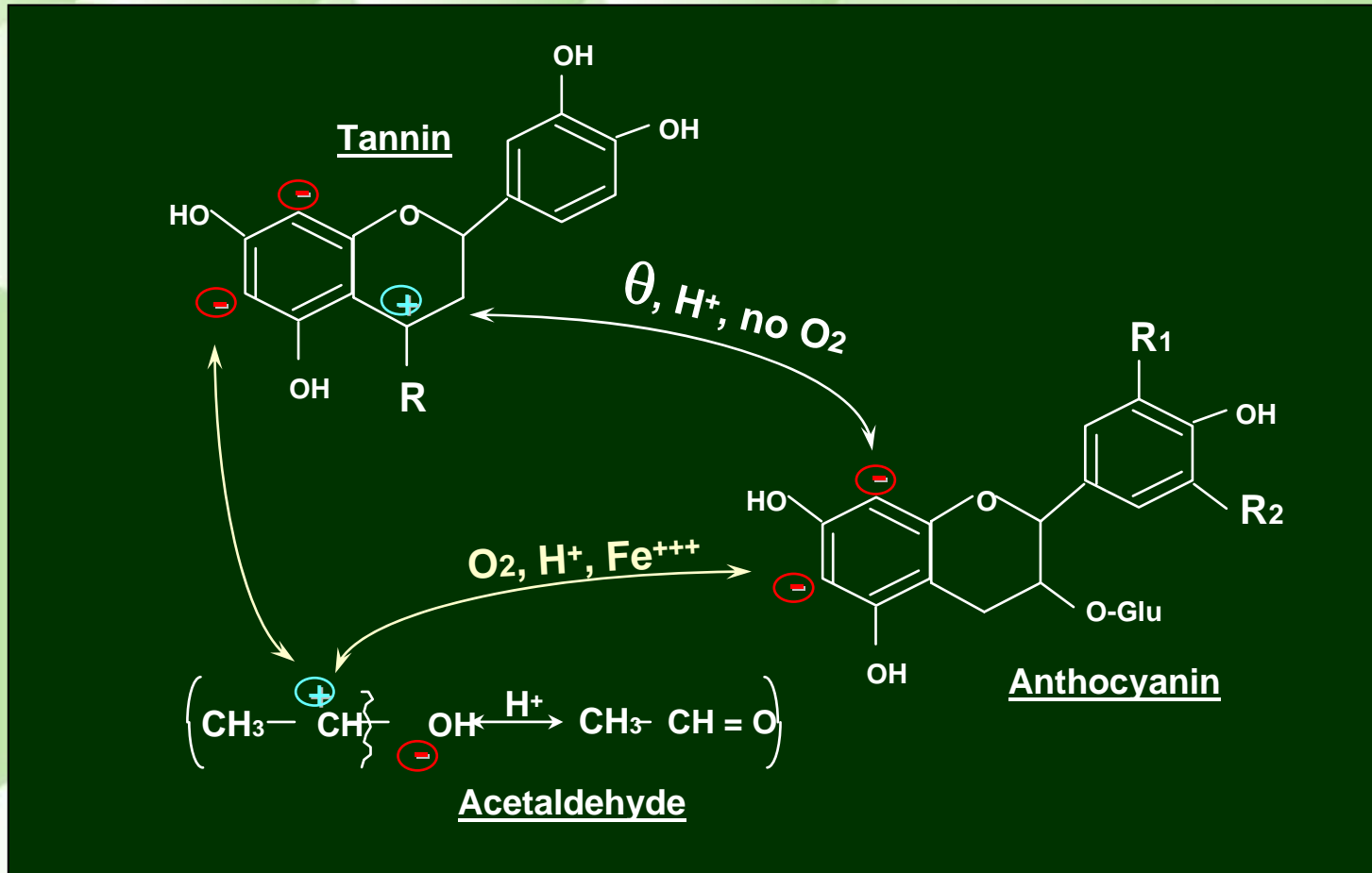
- Manufacturers and winemaker's believe that tannins improve color
- Old model suggested that exogenous tannins bound with anthocyanins as well as remain in the wine increasing the total amount of available tannins in solution
- Academics have not found evidence that exogenous tannins bind with anthocyanins and improve sensory qualities in experiments

Questions

- Is there protein in red wine?
- If there is, what happens to it?
- If there is, when is it in solution?
- What tannins are available first?
- What are the most valuable tannins and where do they come from?

Color stabilization

The Laffort Theory & the VR Supra Principle



Protein in wine

Origin:

- Grapes
- Micro-organisms (cell wall, metabolic)
- Exogenous (Fining,...)

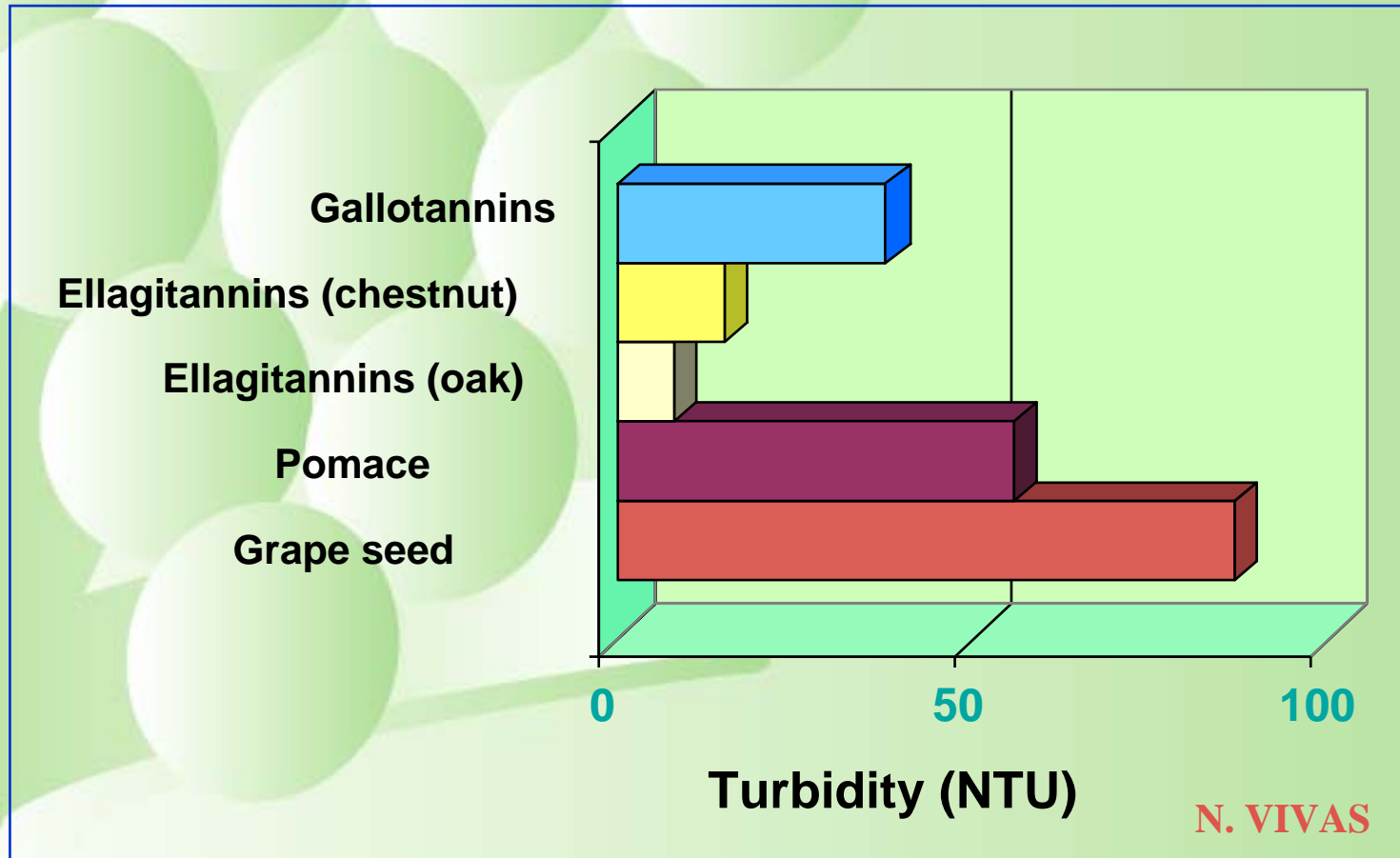
The influence of technology:

- Cold soaking increases the amount of protein

Proteins react with the tannins in wine

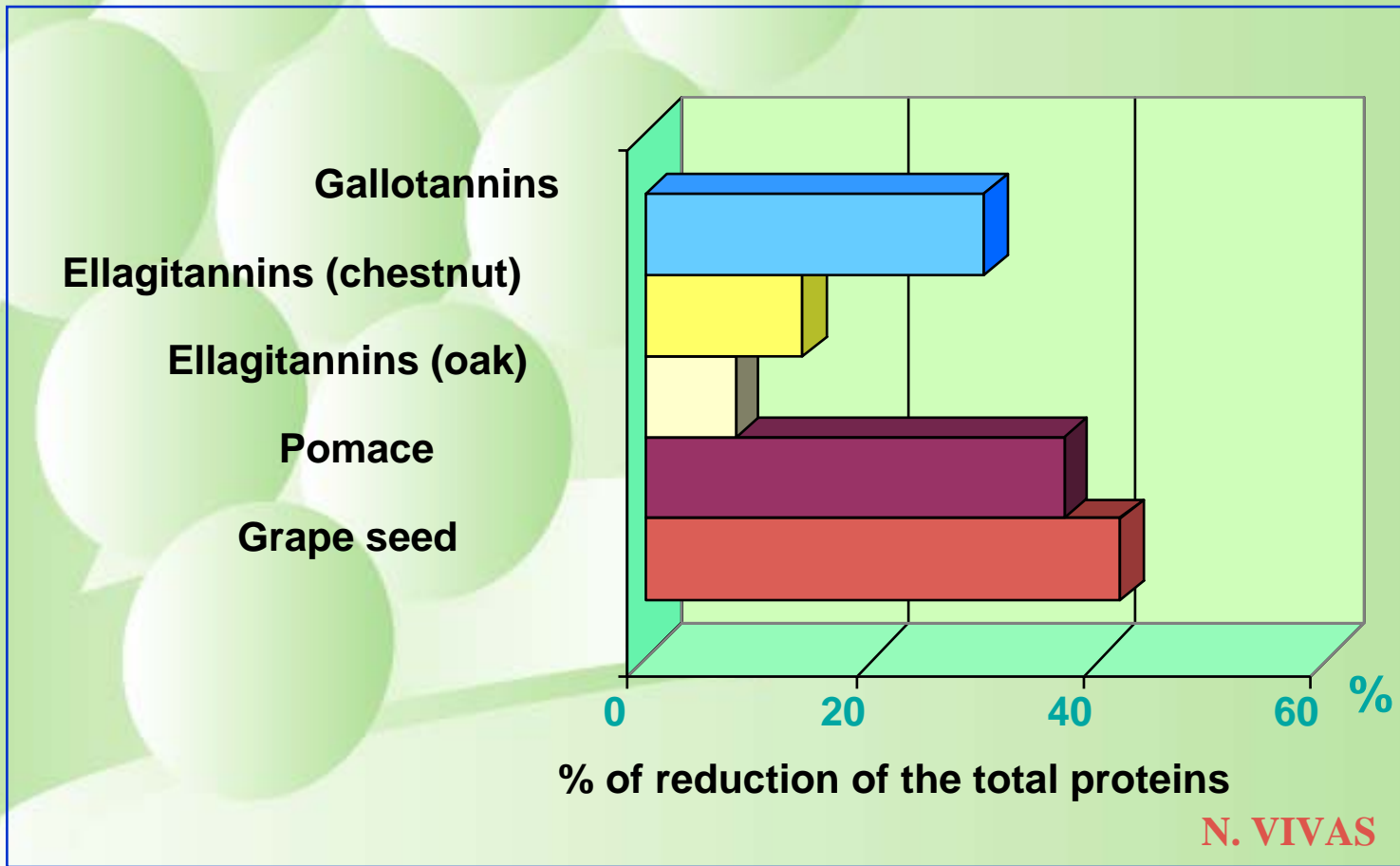
Protein/Tannin in wine: Reminder

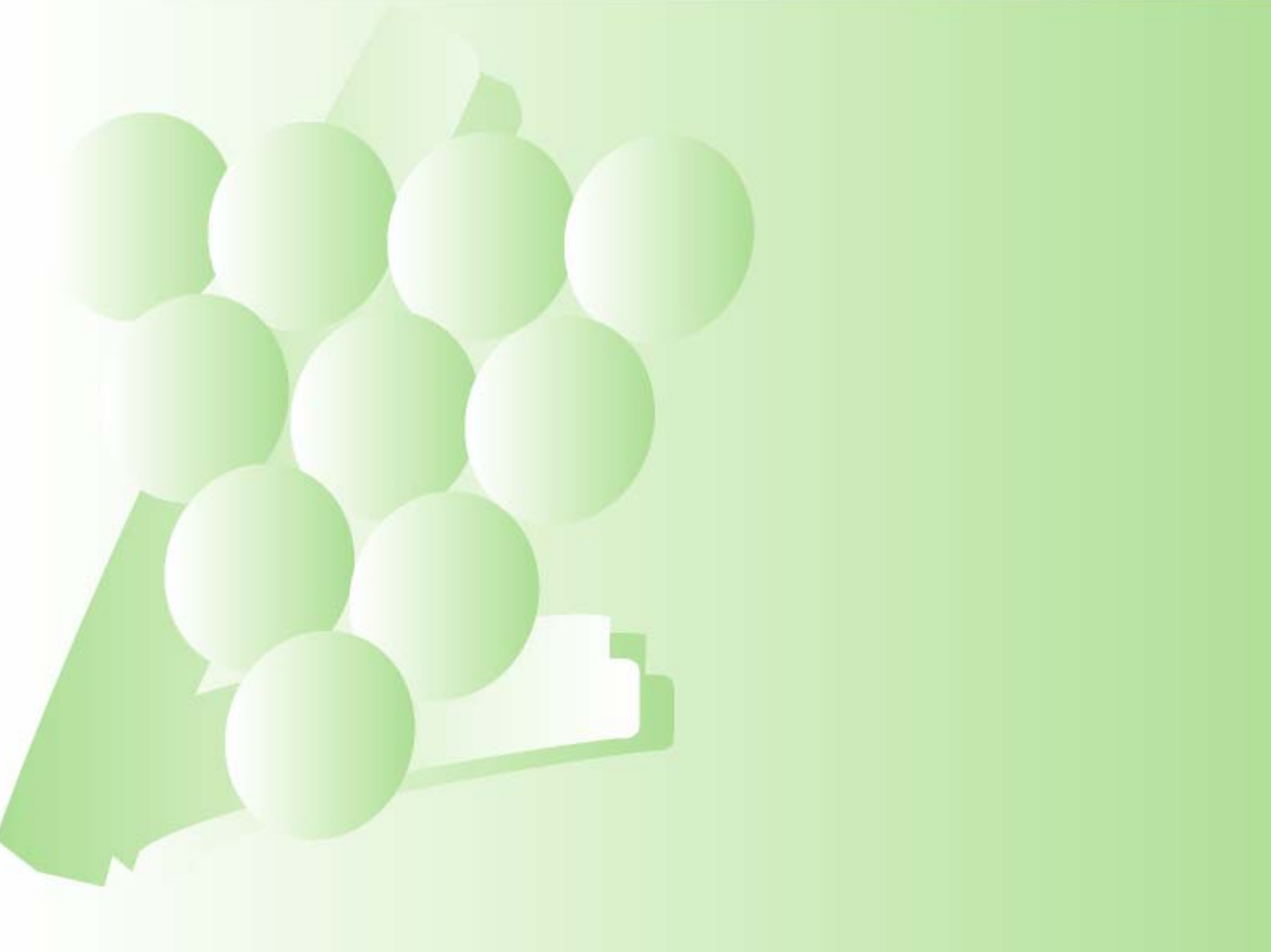
Tannin solution (1 g/L) + cold soluble gelatin (50 mg/L)

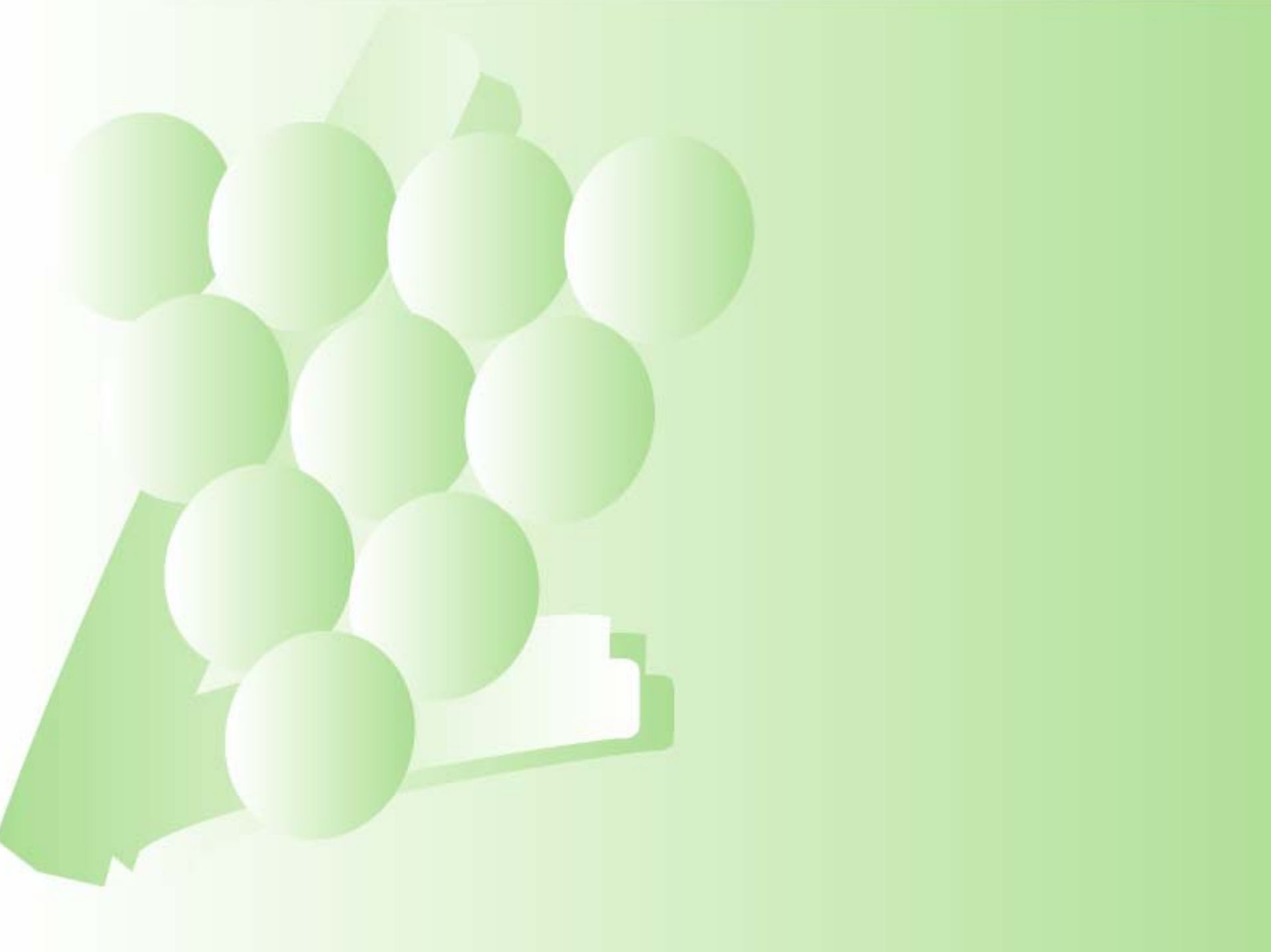


Protein/Tannin in wine: Reminder

Tannin solution (1 g/L) + cold soluble gelatin (50 mg/L)







Influence of the polymerization level

Dry white wine 2004: Not heat stable (NTU = 90)

Addition of grape tannins at 50 g/hL with a different ddp:

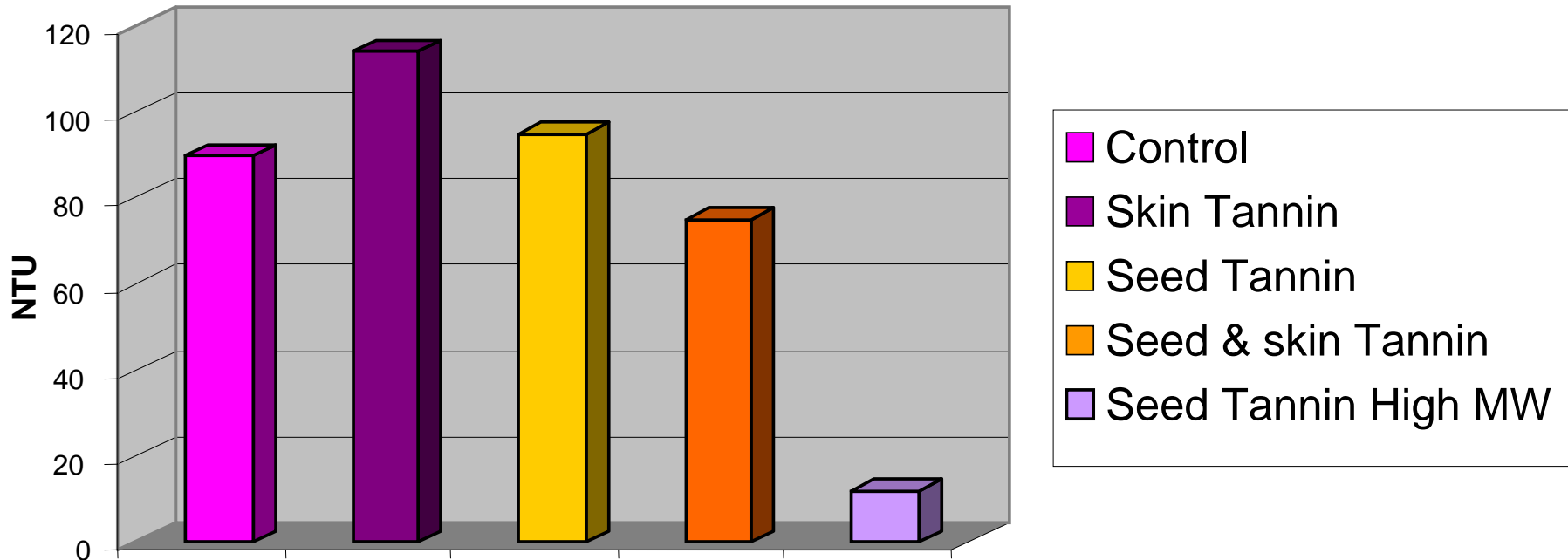
Skin tannins ddp = 1.6

Seed tannins ddp = 3.0

Skin and seed tannins (Biotan) ddp = 3.8

Tannins with high molecular weight (OI) ddp = 12

Filtration at $0.45\mu\text{m}$ at $t = 24\text{ h}$ + heat test



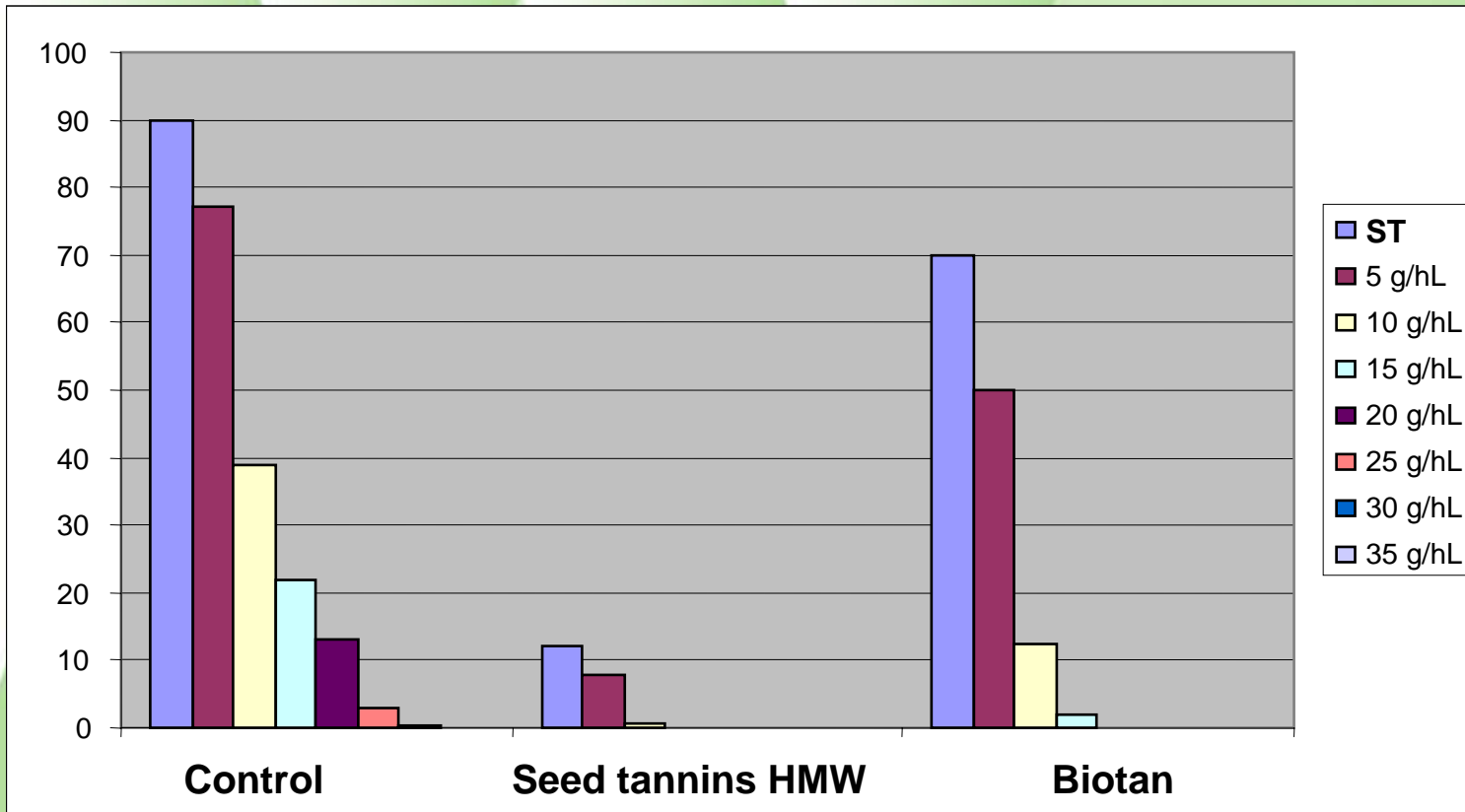
Influence of the polymerization level

Vin blanc sec 2004: Not heat stable (NTU = 90)

Addition of tannins HMW and Biotan at 500 ppm

Treatment at 50, 100, 150, 200, 250, 300 and 350 ppm of Bentonite

Filtration at 0.45 μ m at t = 24 h + Heat test

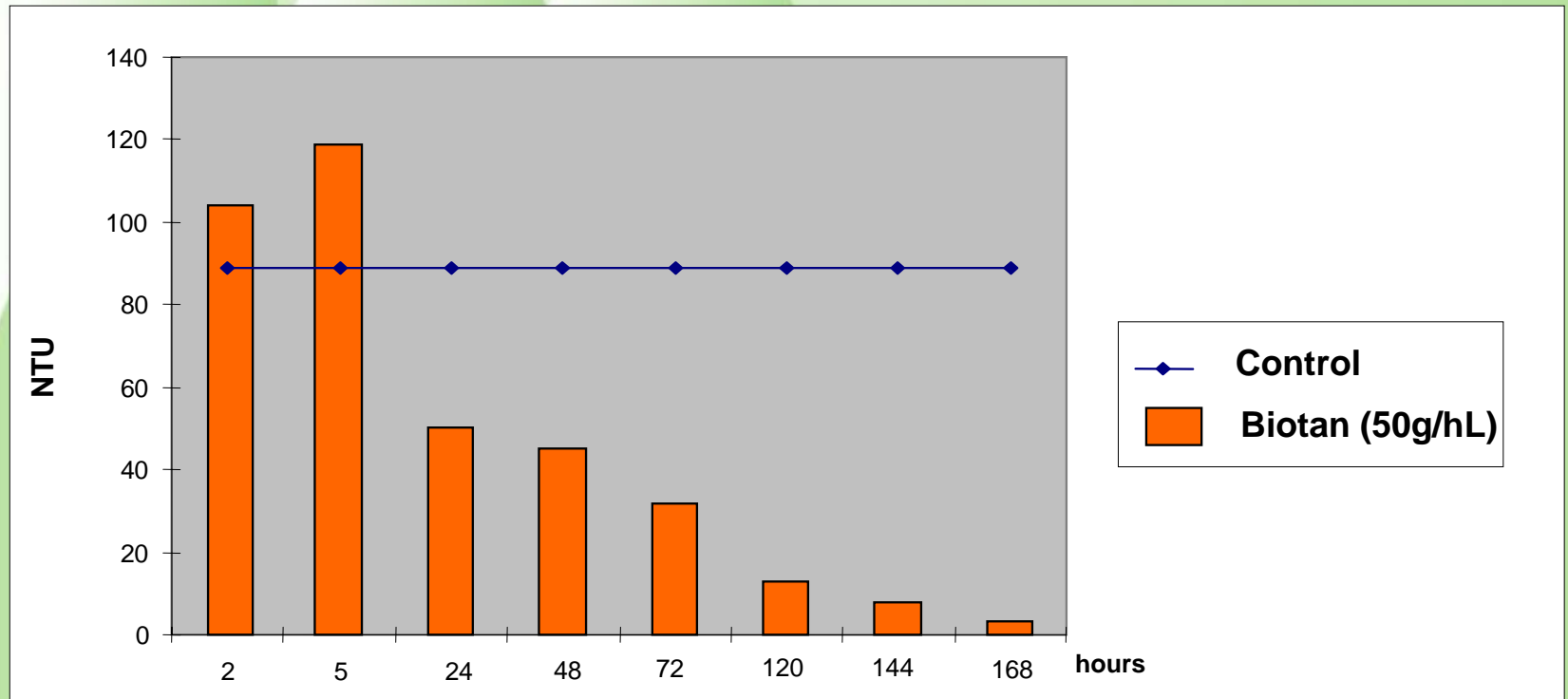


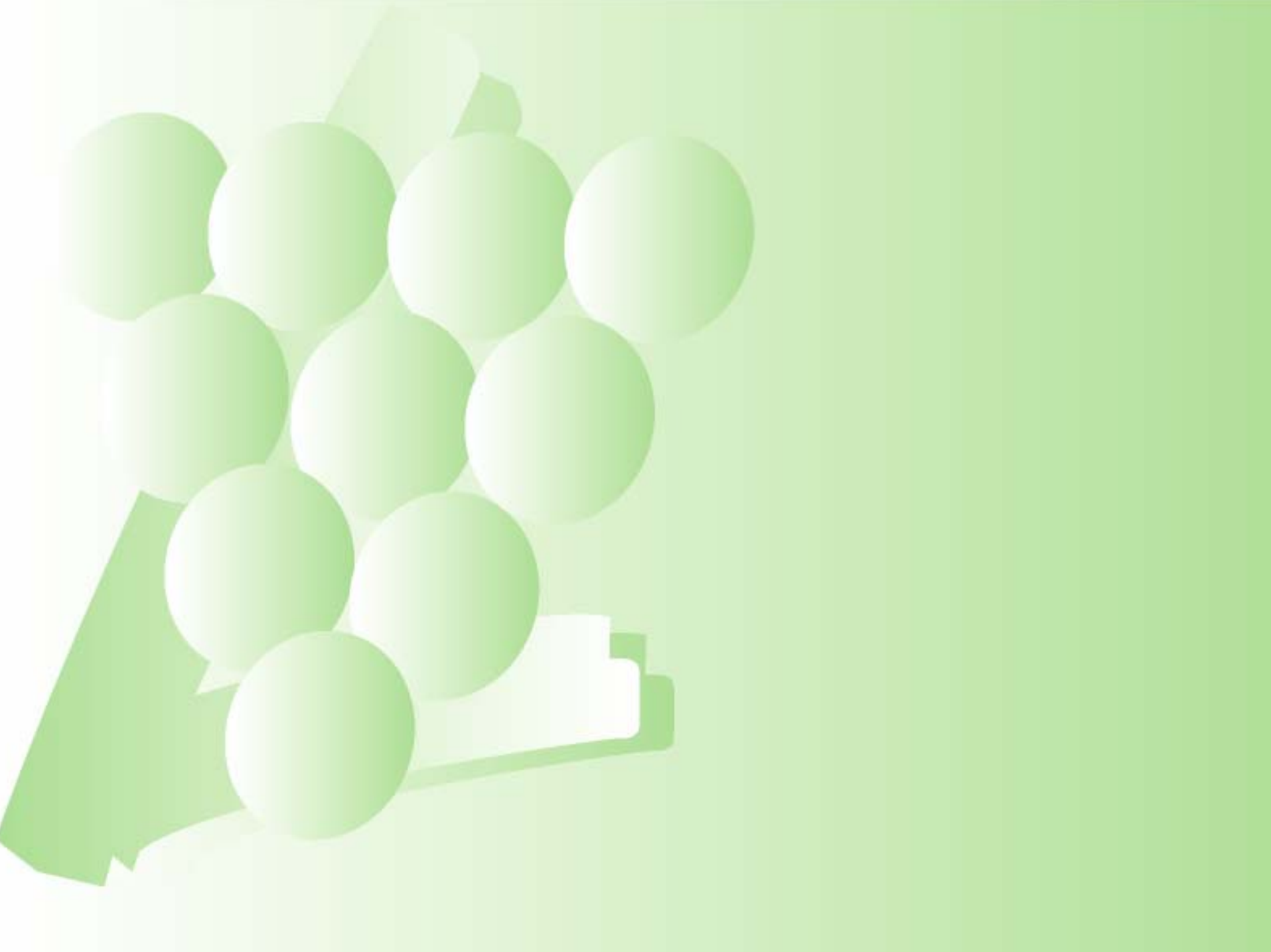
The addition of highly polymerized tannins reduces the amount of Bentonite (about 2/3).

Influence of the polymerization level

Dry white wine 2004: Not heat stable (NTU = 90)

Addition of grape tannins (Biotan) at 500 ppm and acetaldehyde at 10 ppm after disulfiting the wine with H_2O_2
Filtration at $0.45\mu m$ + Heat test





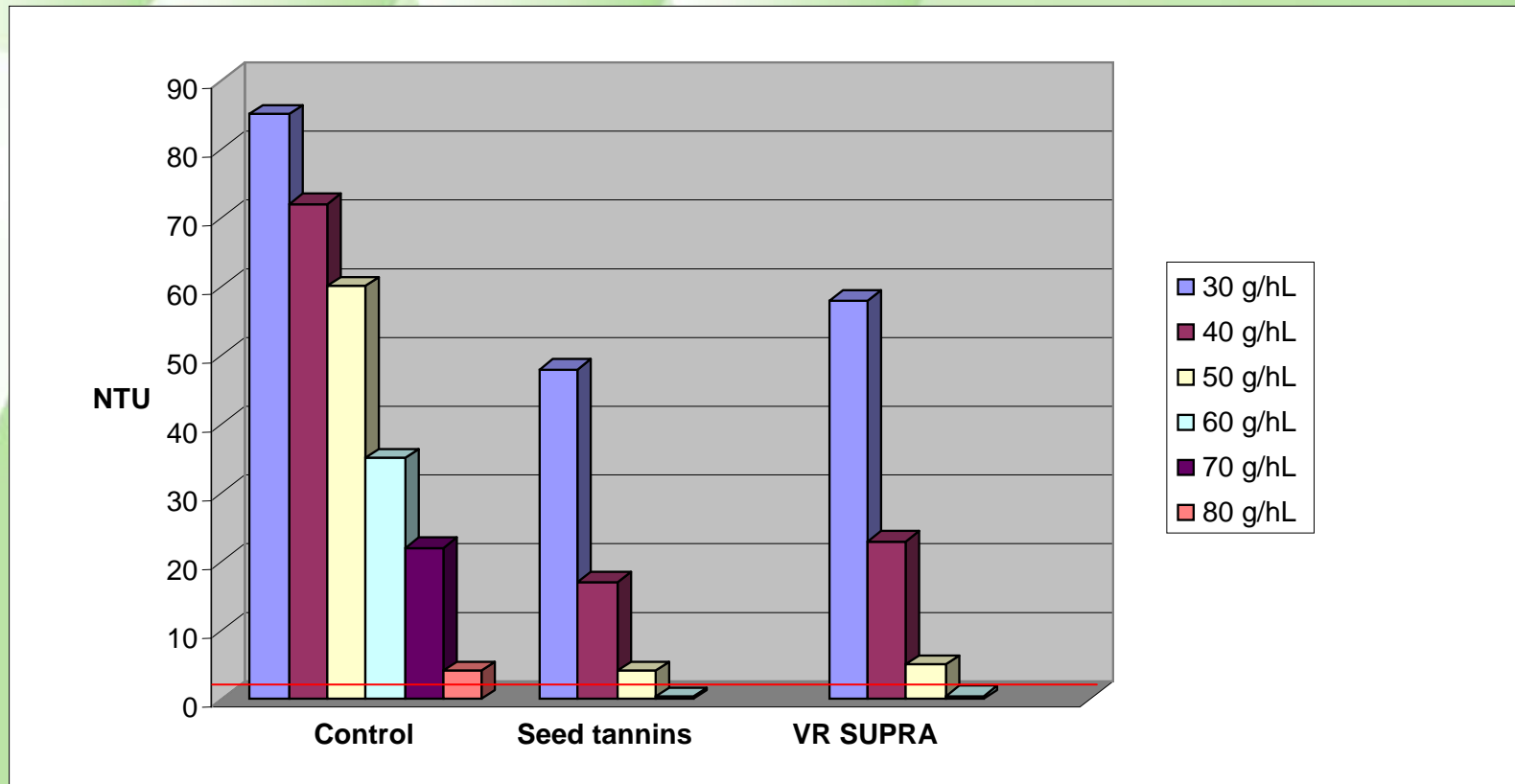
Tannin/Protein Interaction with Bentonite

Vin rosé 2005: Not heat stable (NTU = 165)

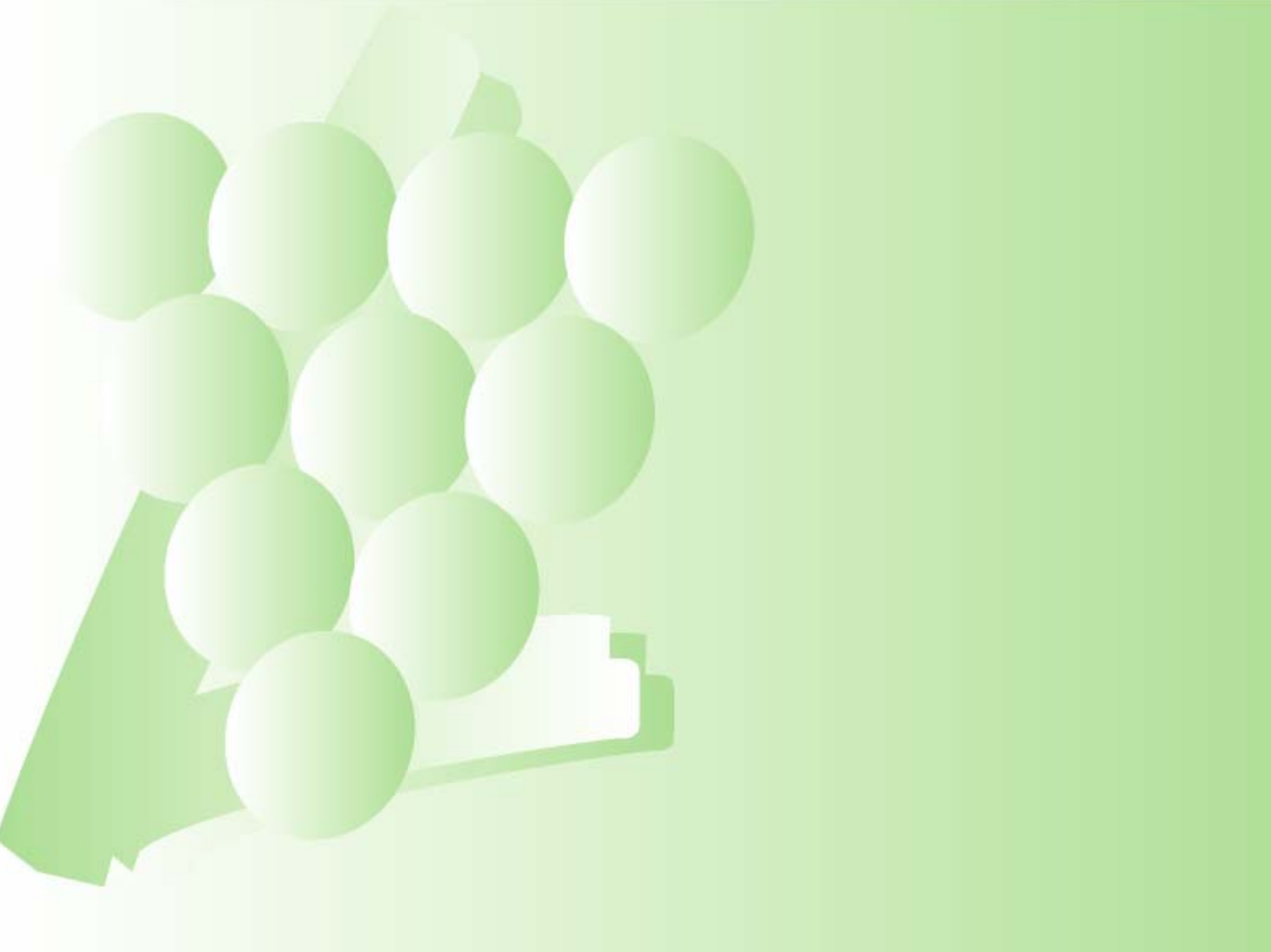
Addition of seed tannins and **Tanin VR Supra** at 500 ppm

Treatment at 300, 400, 500, 600, 700, 800, 900, ppm of Bentonite

Centrifugation and filtration at 0.45 μ m at t = 24 hours + Heat test



The addition of certain preparations (VR Supra) decreases the amount of Bentonite required (bentonite = protein)



The VR Supra Effect

Wine tannins

Tannins (aqueous phase)

Tannins (alcoholic phase)

Proteins (aqueous phase)

Fermentation & maceration

~~Tannins (aqueous phase)~~

~~Proteins (aqueous phase)~~

Wine Tannins

Precipitate Tannin/Protein

**Reduction of the tannin
equilibrium in wine**

(Insufficient ratio A/T)

1/4 is Minimum

The VR Supra Effect

Wine tannins

Tanin VR Supra

Tannins (aqueous phase)

Tannins (alcoholic phase)

Proteins (aqueous phase)

~~Tanin VR Supra~~

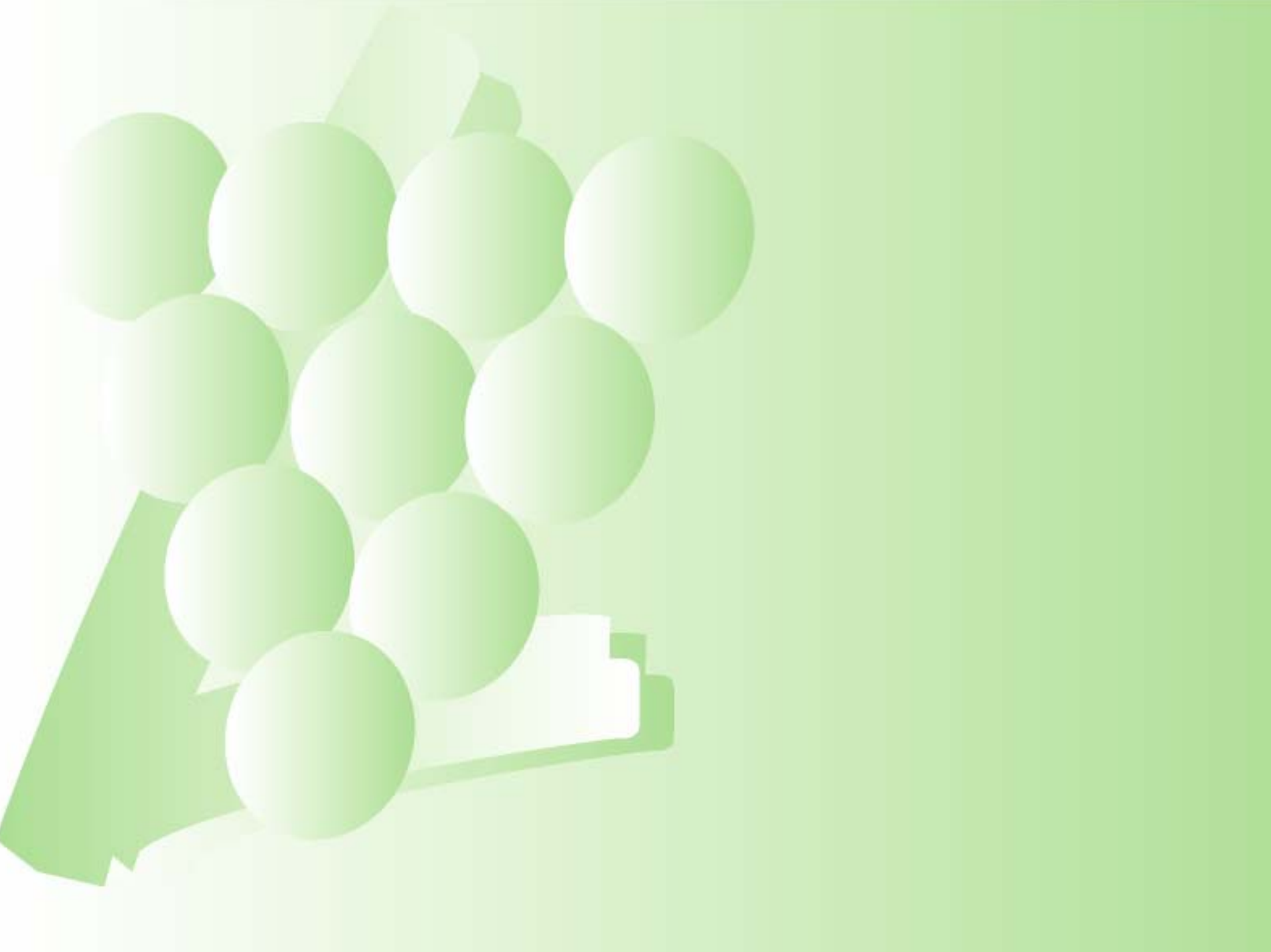
~~Proteins (aqueous phase)~~

Tannins (aqueous phase)

Tannins (alcoholic phase)

**Increased softer tannins
→ Premium wine profile**

**Limit the extraction of the
most aggressive tannin
during the alcoholic phase.**



What we think is happening

- ❶ **Tanin VR supra** reacts with grape proteins (during cold soaking). These proteins are less likely to react with the indigenous tannins, mainly the skin tannins that are extracted first.
- ❷ Reduction of seed tannins (extracted during the hydro-alcoholic phase) better preserves the Anthocyanin/Tannin equilibrium.
- ❸ Decrease of the most aggressive tannins during the alcoholic phase.
- ❹ Preservation of the potential of quality tannins from grapes
 - ➔ **VR SUPRA**: Mimics the grape tannins reaction with proteins
 - ➔ **VR SUPRA**: adapted to premium wine vinification needs

What this means to the winemaker

- Winegrowers go to great lengths to ensure the highest quality in their grapes (color, soft tannins etc.)
- VR Supra addition at reception allows the winemaker to maximize the color potential in the grapes
- VR Supra allow the winemaker to preserve the best (skin) tannins in the wine for highest quality wine possible.
- Frequently, even though additional tannins are added, the wine taste softer and more elegant (less tannic)

Laffort Oenologie thanks you for your attention

All research performed under the direction of Bruno Marquette in the laboratories of Laffort/SARCO and the University of Bordeaux (More to come!)

