FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

· DESCRIPTION OF THE PROCESS

The principle involves, in the shortest time possible , the thermo-treatment of the de-stemmed and drained harvest and the cooling in a fraction of a second through high vacuum, continuously in a tank under vacuum.

• Heating

The objective is to heat the berries in just a few minutes (2 to 5 minutes generally) up to 80 or 90°C.

• Vacuum / Cooling

The vacuum chamber is a reinforced tank which is maintened under high vacuum (50hPa/75 hPa absolute pressure) by a pump connected to a condenser.

Putting a hot subtance into a vacuum **creates instant evaporation of the water**, the subsequent cooling allowing the reach the required temperature is attained (30 to 35°C)

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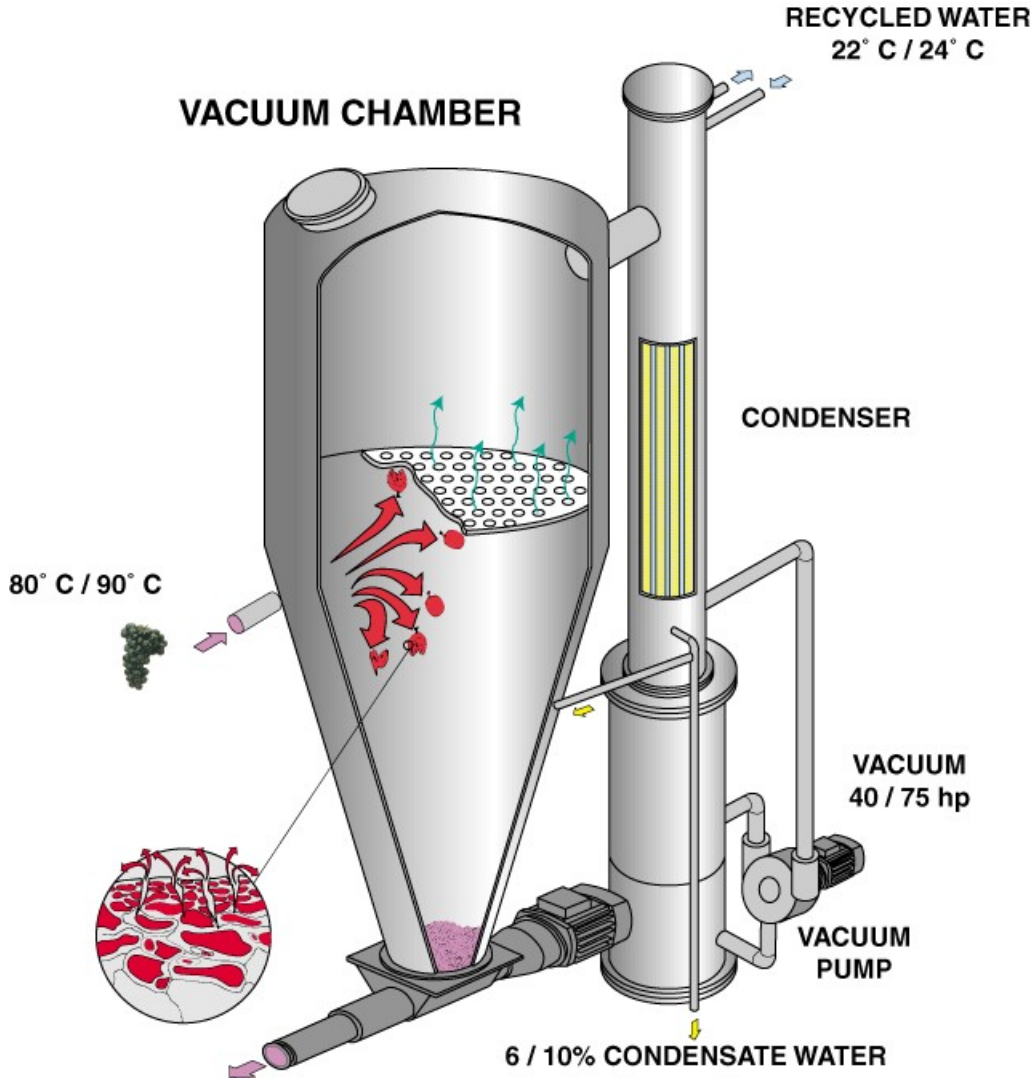

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MAKING THE MOST OF GRAPES

The mass of water evapored is given in the equation :

$$E = M.\ Cs.\ \ \Delta\theta\ /\ \lambda$$

M mas of fruit processed (kg)
Cs specific heat of the juice (Kcal/°C x kg)
λ evaporation heat under vacuum
$\Delta\theta$ difference in temperature of the fruit between entry and exit

For example, under high vacuum of 50 hPa, the temperature of instant balance is 32°C. The evaporation (E) for 100 kg of fruit under vacuum heated to 82°C is therefore equal to :

E = 100 x 0.875 50/570 100 = **7.6kg water / 100kg of fruit**

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

In the vacuum conditions above, 1 kg of water occupies 29m³.

Such a volume of steam (223m³ for 100kg harvested) creates a **sudden expansion which causes the fragmentation** of the cellular structures.

The use of high volume avoids the dissolving of oxygen during the procedure.

The harvest is extracted continuously from the tank by displacement pump prior to the wine making process.

NOTE : This process must not be considered as pasteurisation.

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

Principle of evaporation vacuum
Balance liquid / steam (boiling point)

Pressure	Balance of temperature (boiling point)	Volum of steam evaporation
10 hPa	7,0 °C	131,70 m^3/kg
20 hPa	17,2 °C	68,28 m^3/kg
* 50 hPa	32,0°C	28,23 m^3/kg
75 hPa	38,7 C	21,52 m^3/kg
100 hPa	45,4 °C	14,95 m^3/kg
* * 1000 hPa	99,12 °C	1,72m^3/kg

Vacuum work condition →

* The level of vacuum used gives the level of the temperature.

* * Reference atmospheric pressure conditions.

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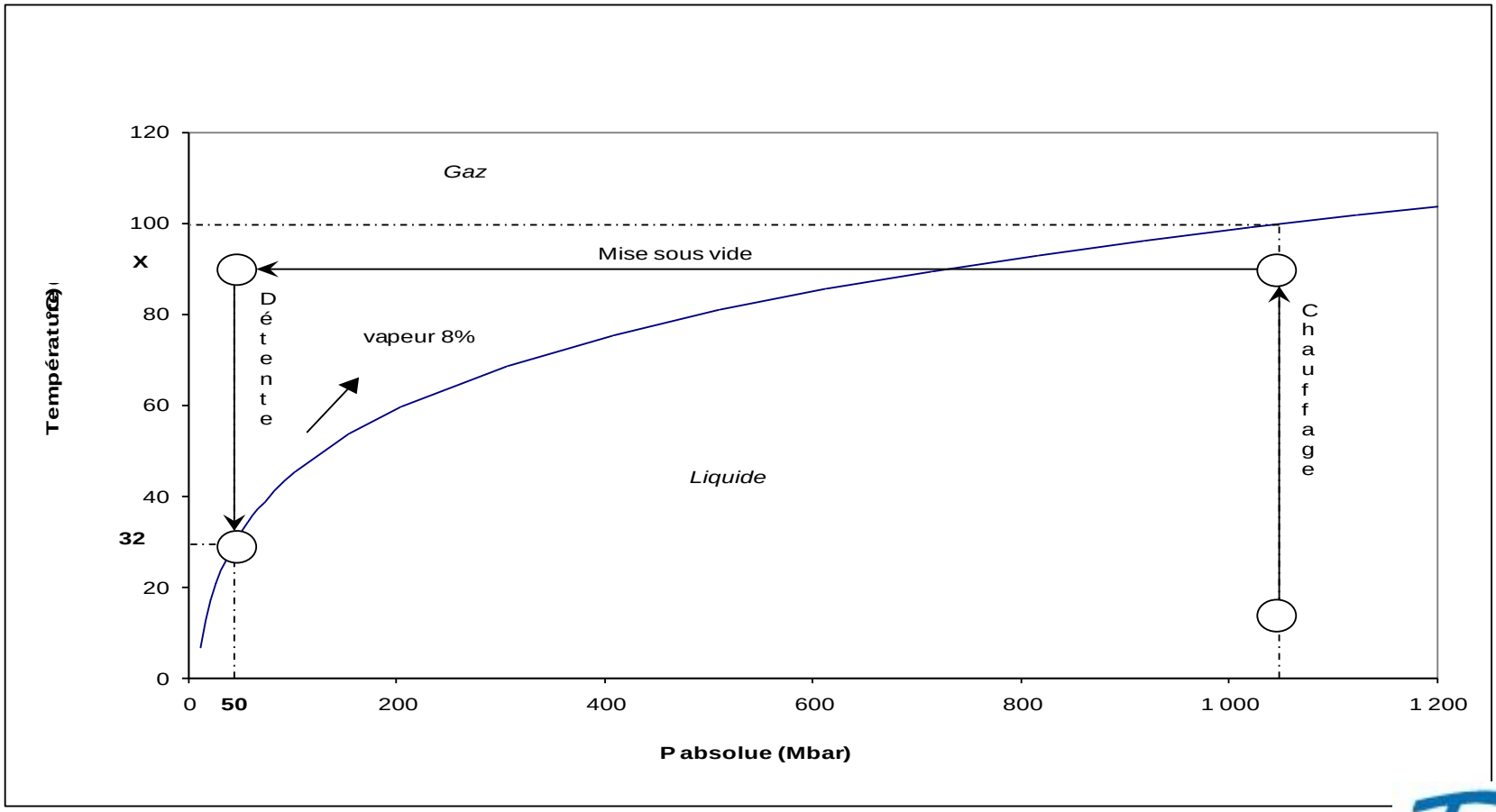

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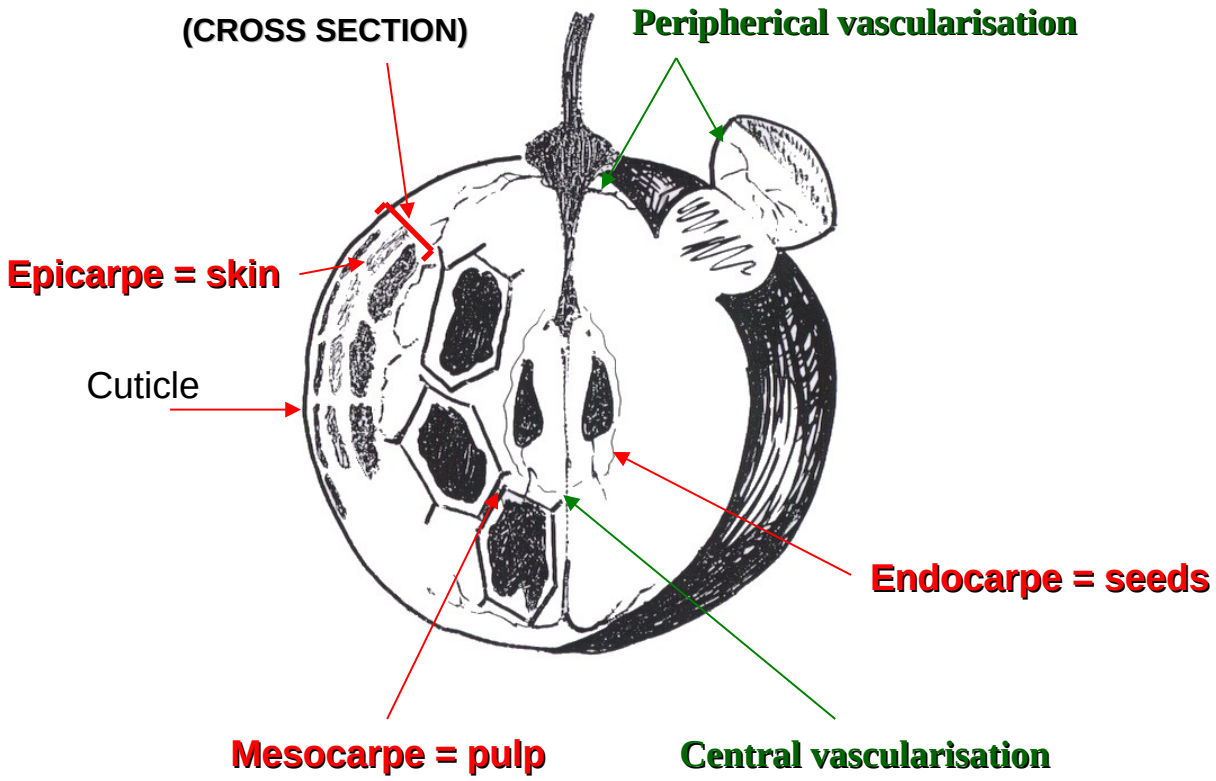
MAKING THE MOST OF GRAPES

GRAPE BERRY



COMPOSITION % WEIGHT

Epicarpe

- Skin 10 à 20

Mesocarpe

- Pulp 70 à 85

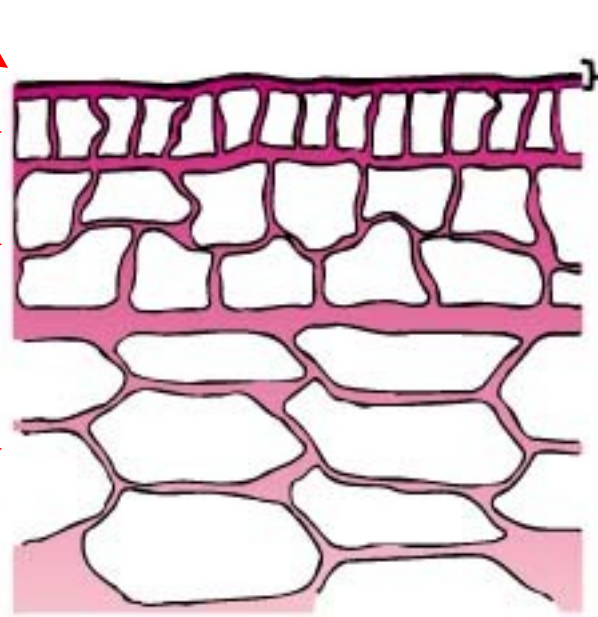
Endocarpe

- Seed 2 à 6
- Stalk < 5

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

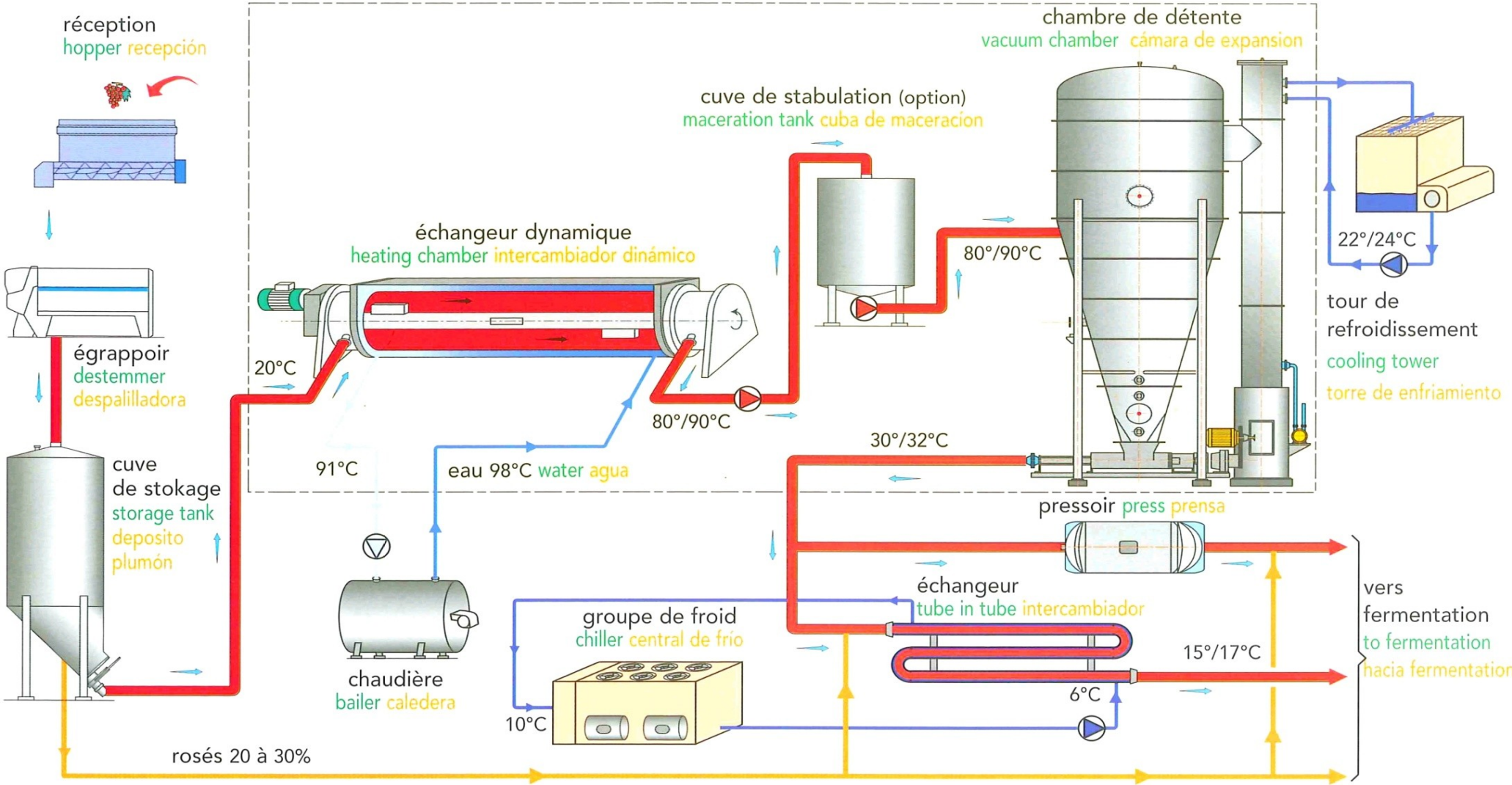
MAKING THE MOST OF GRAPES

CROSS SECTION OF SKIN GRAPE



F.D.T : Affects the reserve and the quality components of grapes found in the skin of the grape berries, keeping seeds intact

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT



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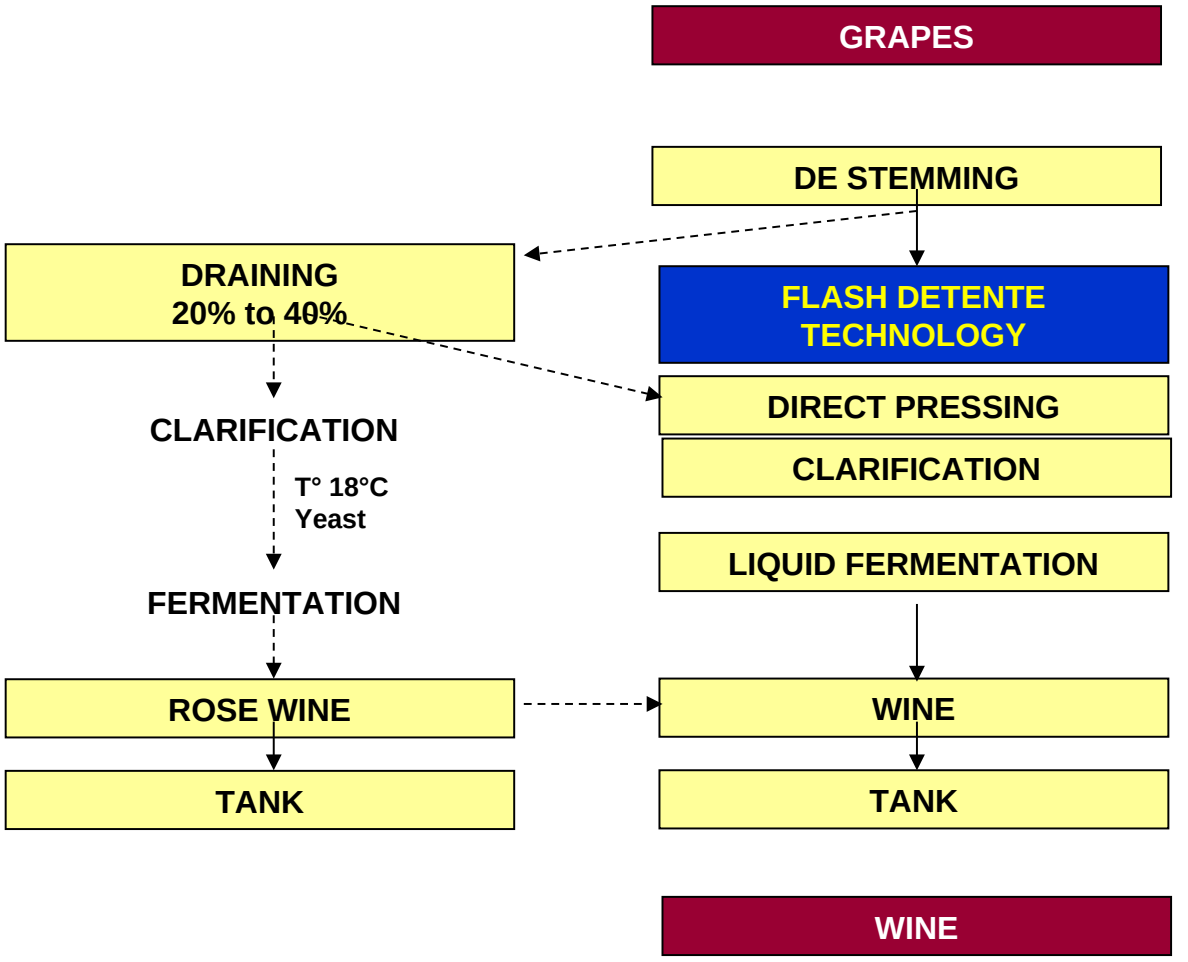
FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

EXAMPLE 1



Important yield
Medium polyphenolics compounds

NTU< 100 amylic
150 <NTU<400 red fruits +/- fresh

T° 23°C (Red fresh fruits) or T°16°C(amylic)
Yeast
Macro-oxygenation
cheeps (option)
Micro-oxygenation

Early Clarification after AF

"CONTEMPORY WINE"
New wine 1 to 2 years

Color
Roundness
"Type fruité"

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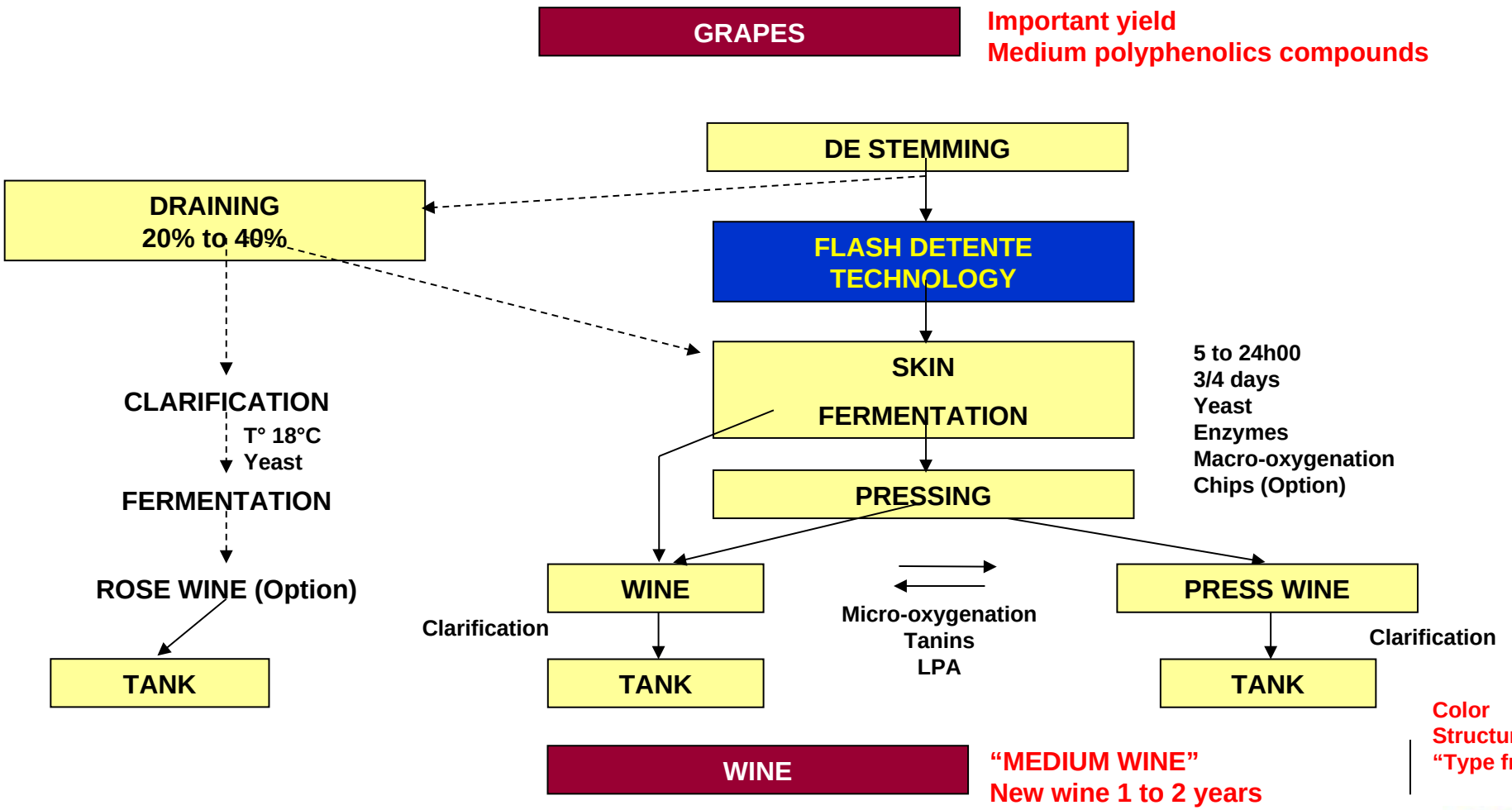
FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

EXAMPLE 2



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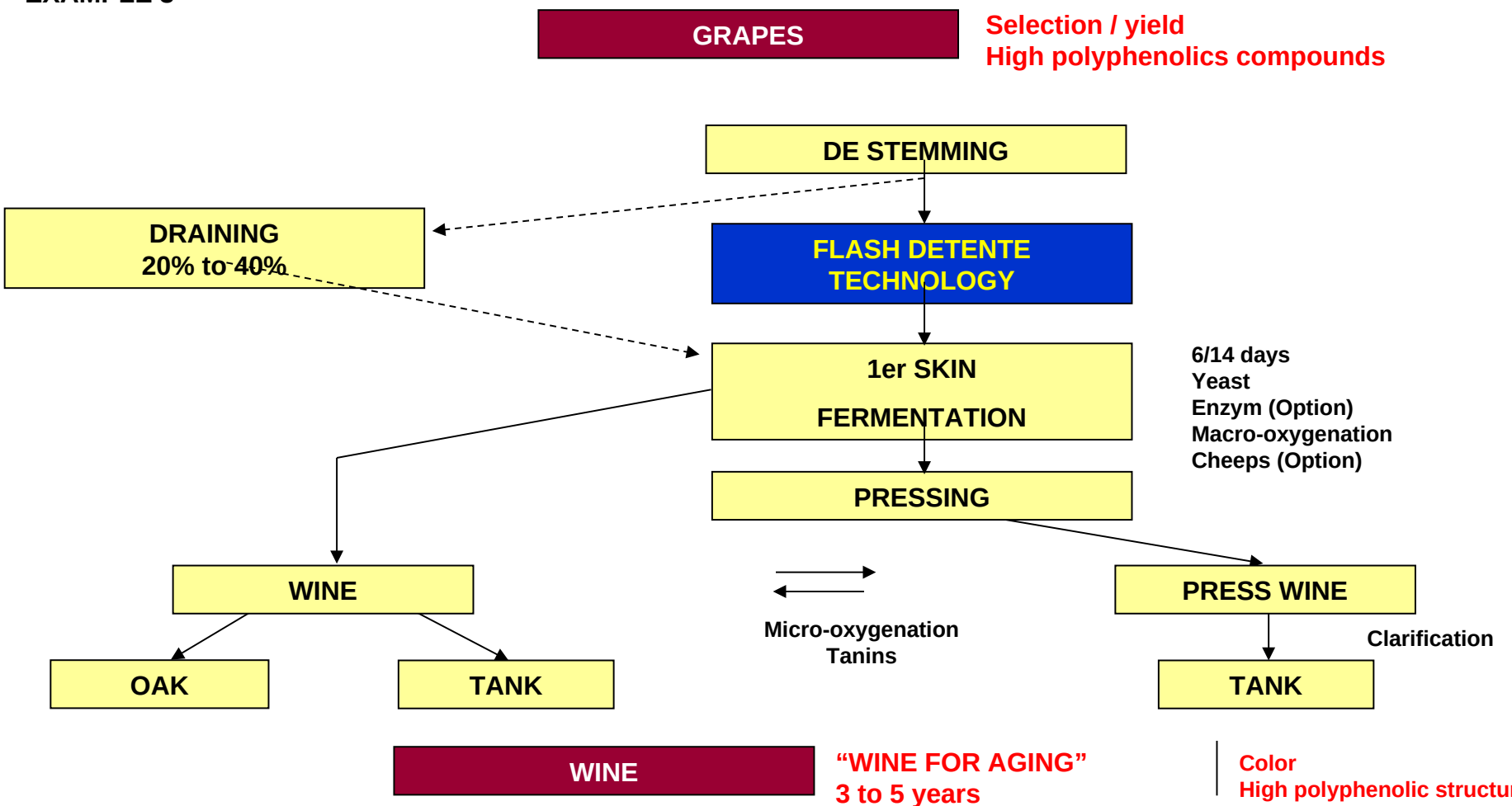
FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

EXAMPLE 3



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FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

Major effects of the process on wine itself :

- ✓ Better tanins and anthocyanins extraction :

  Tanins extraction occurs in « sugar phase » , without Alcohol. That means less green tanins

- ✓ Better Polysacarides extraction :
- ✓ Less Pyrazines (vegetal aromas)
- ✓ More « fresh red fruits » aromas
- ✓ Increases wine level for low quality grapes
- ✓ assist to protect integrity of the wine style
- ✓ Better yield of quality wine

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

Major effects of the process on economy:

- ✓ Tank optimisation:
  - **No more pumping-over**
  - **Use of total tank volume**
  - **Faster alcoholic fermentation**
  - **Better temperature control during AF**
- ✓ Work optimisation
  - **Automatic controlled process**
  - **Emptying tank easier**
  - **Fermentation tanks bigger**
- ✓ Saving energy :
  - **Natural outside temperature : heating grapes easier than cooling**
  - **Better cooling exchange during AF**

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

Major effects of the process on wine processing :

- ✓ « Opening » technical pathways
  - -**Direct pressing, liquid phase fermentation :**
    - ➢ **Low NTU/ AF T° = amylic aromas (fermentation bouquet)**
    - ➢ **medium NTU/ AF T° = red fruits**
  - ➢ **skin contact :**
    - ➢ **1 day without yeasts = better structuration**
    - ➢ **2 or 3 days, starting AF = structuration, higth polysacarides**
    - ➢ **2 or 3 weeks = higth quality wine**
- ✓ Match very well with MicroOxygenation and chips

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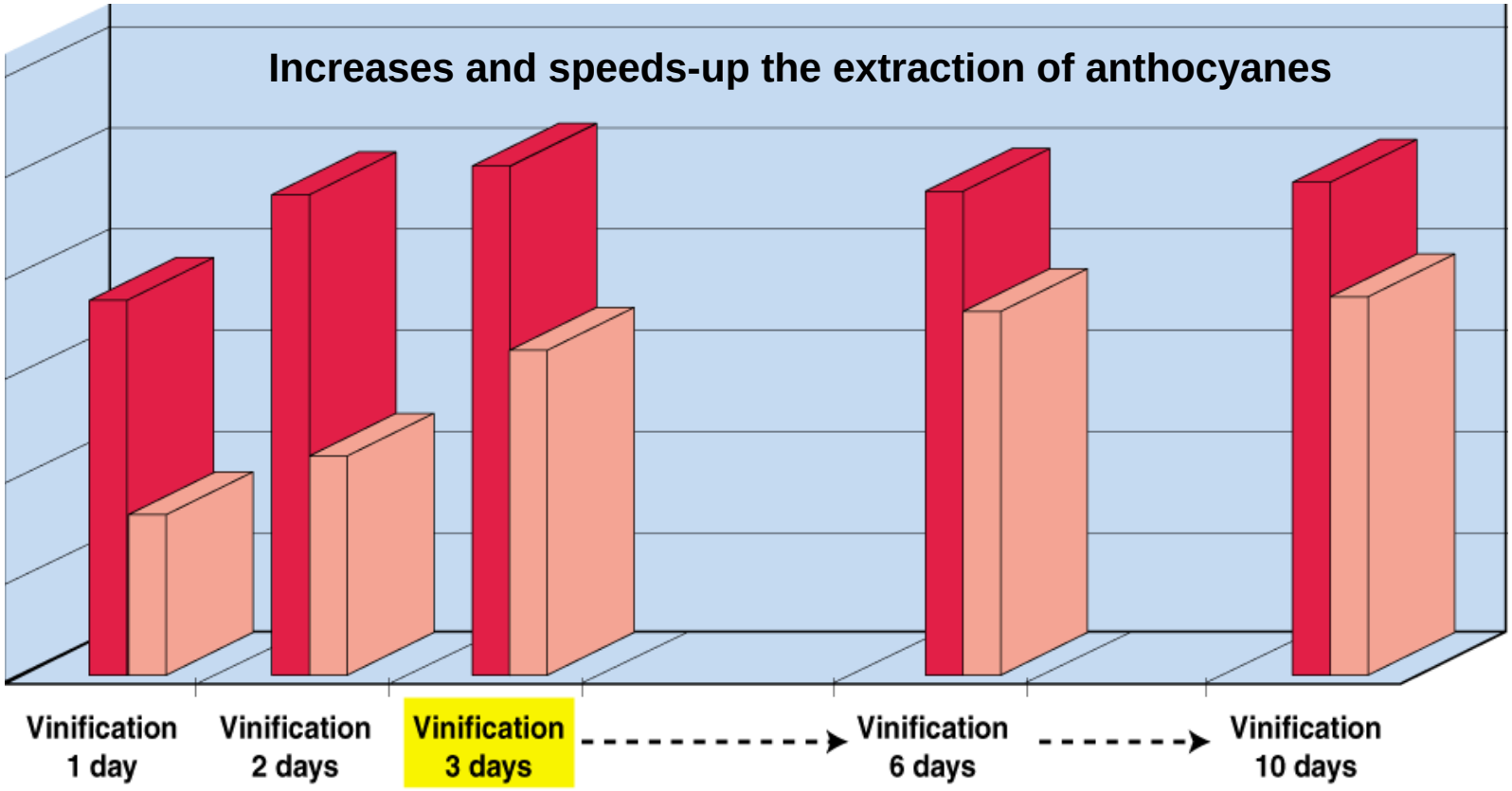
FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

ANTHOCYANES EXTRACTION



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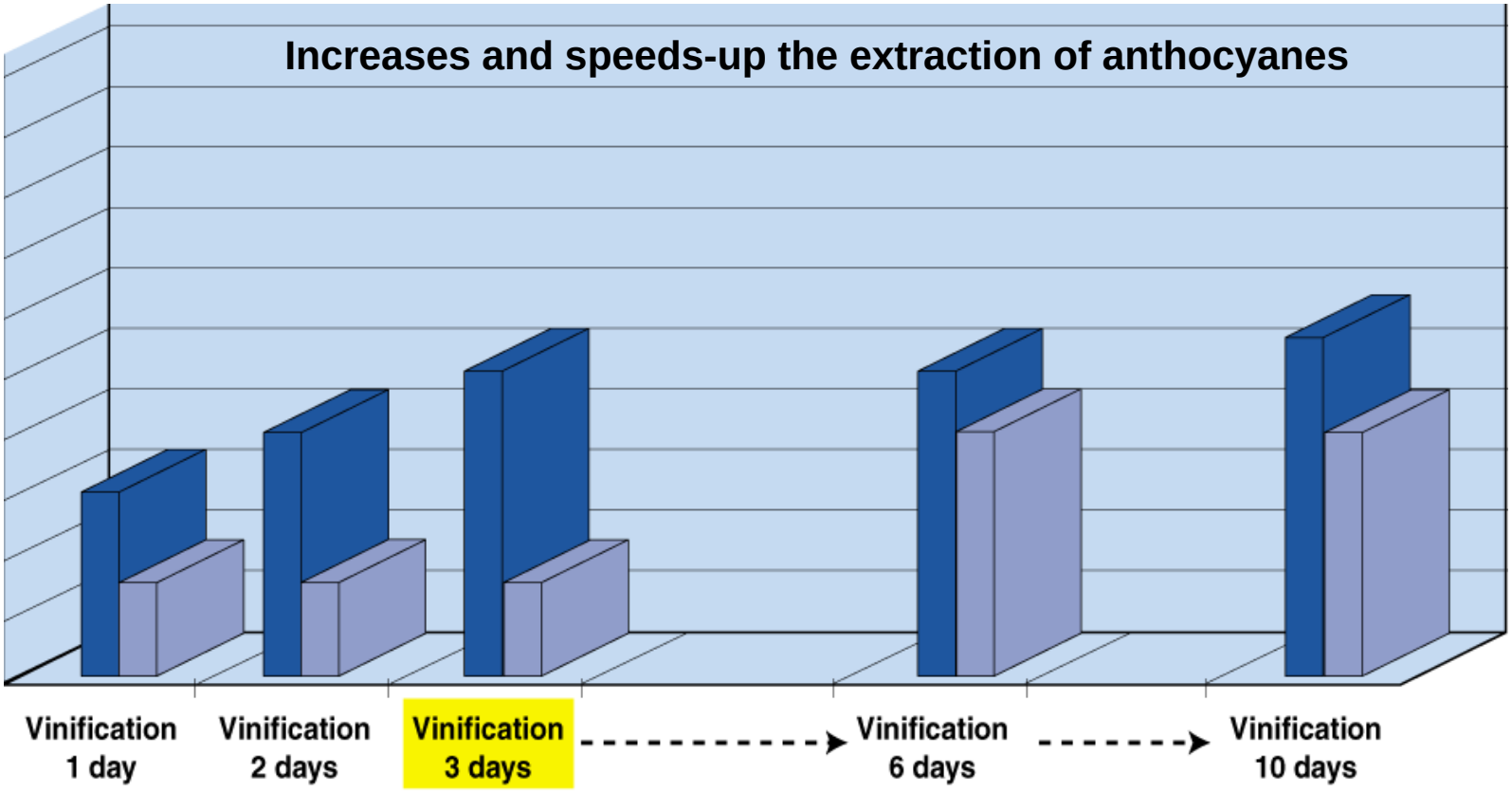
MAKING THE MOST OF GRAPES

COLLOIDS EXTRACTION



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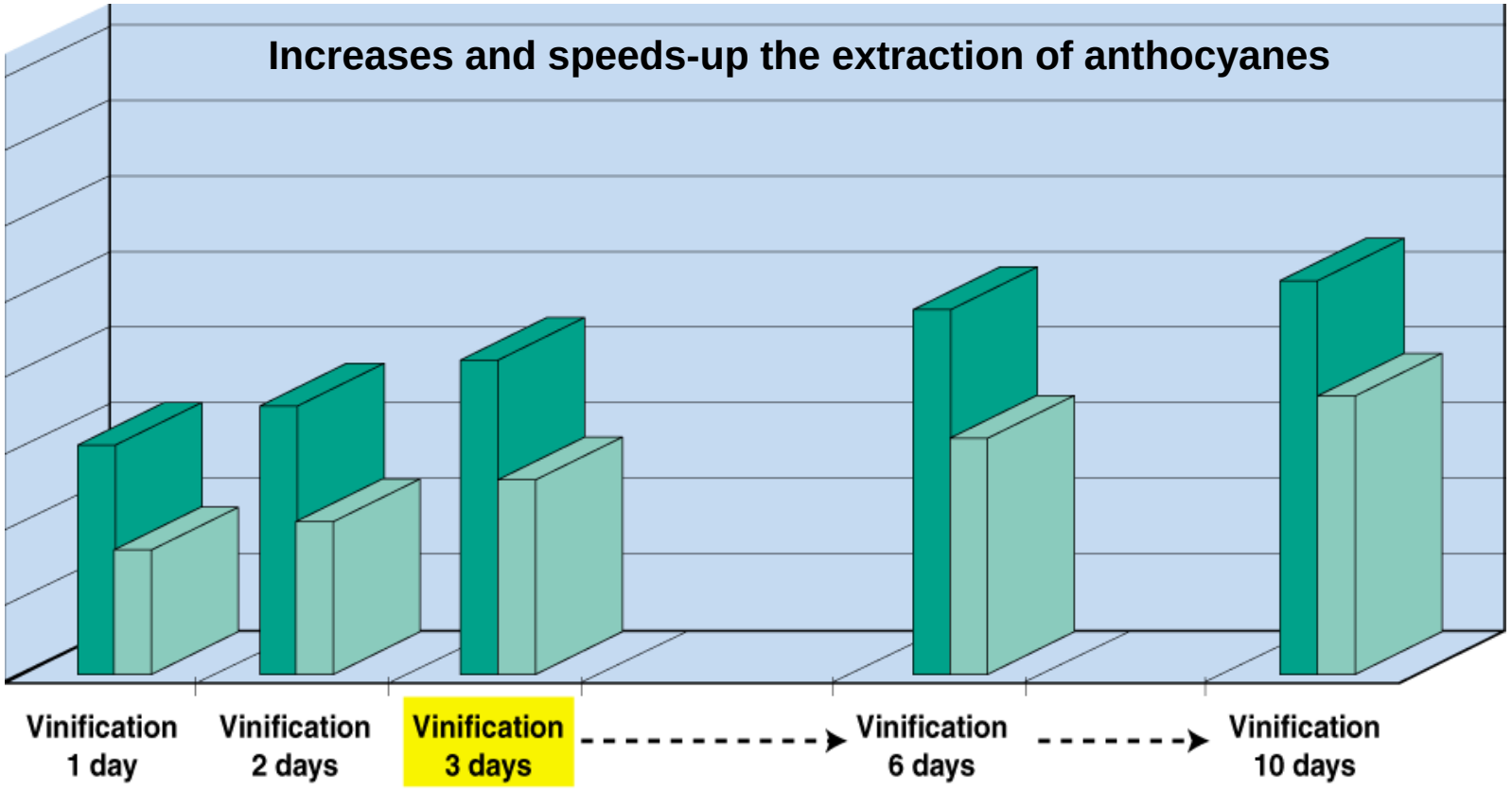
MAKING THE MOST OF GRAPES

TANINS EXTRACTION



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FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

VARIETY OF SYRAH			
Analysis To + 6 months	Flash-Detente	Control	% Improvment
A Total Anthocyanes mg/l	836	601	+39%
B Anthocyanes combined with tanins	328	187	+76%
Ratio B/A	39%	31%	
Procyanidines tanins	4,55	3,10	+46%
I.C. (420+520+620)	23,83	15,28	+55%

Remarks : F.D.T yields enhanced colour stability and longer shelf life

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FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

VARIETY OF CABERNET SAUVIGNON			
Analysis To + 14 months	Flash-Detente	Control	% increase
A Total Anthocyanes mg/l	554	438	+26%
B Anthocyanes combined with tanins	157	143	+10%
Ratio B/A	28%	32%	
Procyanidines tanins	5	4,49	+11%
I.C. (420+520+620)	9,86	8,45	+17%

Remarks : F.D.T yields enhanced colour stability and longer shelf life

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FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

VARIETY OF CABERNET SAUVIGNON			
Analysis To + 42 months	Flash-Detente	Control	% increase
A Total Anthocyanes mg/l	214	175	+22%
B Anthocyanes combined with tanins	93	75	+24%
Ratio B/A	43%	42%	
Procyanidines tanins	5,31	4,63	+14%
I.C. (420+520+620)	8,82	6,90	+27%

Remarks : F.D.T yields enhanced colour stability and longer shelf life

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FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

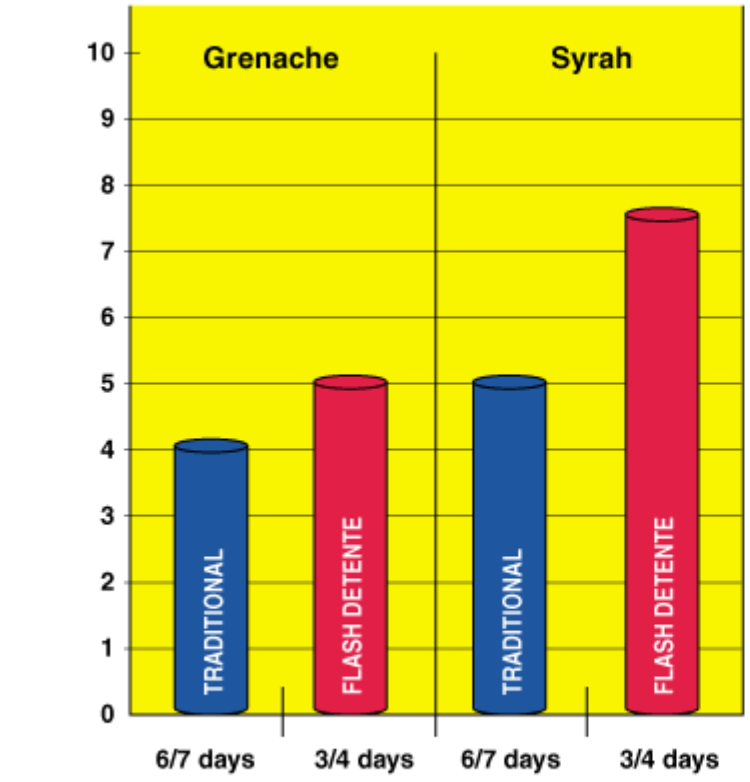
MAKING THE MOST OF GRAPES

WINERY
VILLEDIEU - CÔTES DU RHONE

CASE STUDY

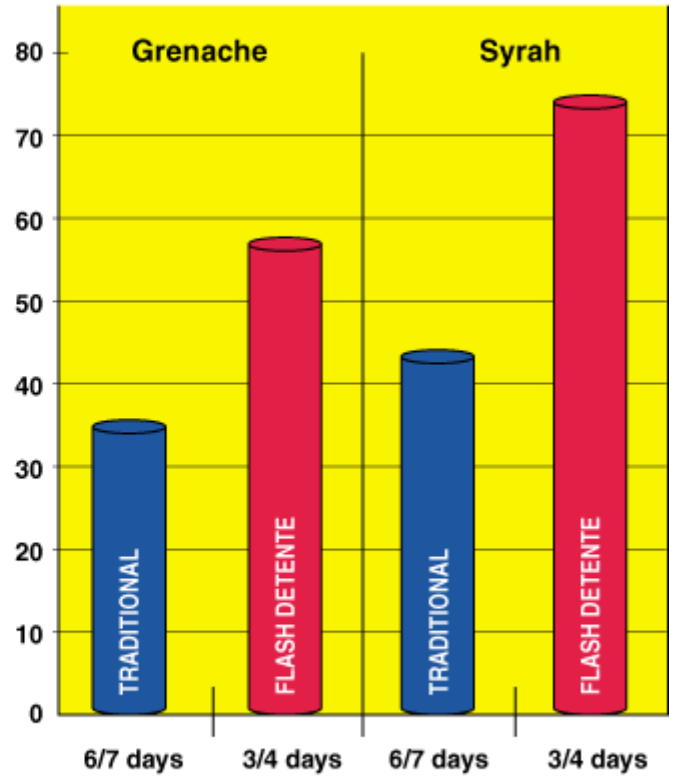
COLOURING INTENSITY

DO420 + DO520 + DO620



TOTAL PHENOLIC COMPOUNDS

DO280x 100



TRADITIONAL FLASH DETENTE TECHNOLOGY

Analysis performed by the laboratory :
Institut Rhodanien - ORANGE (84) - FRANCE

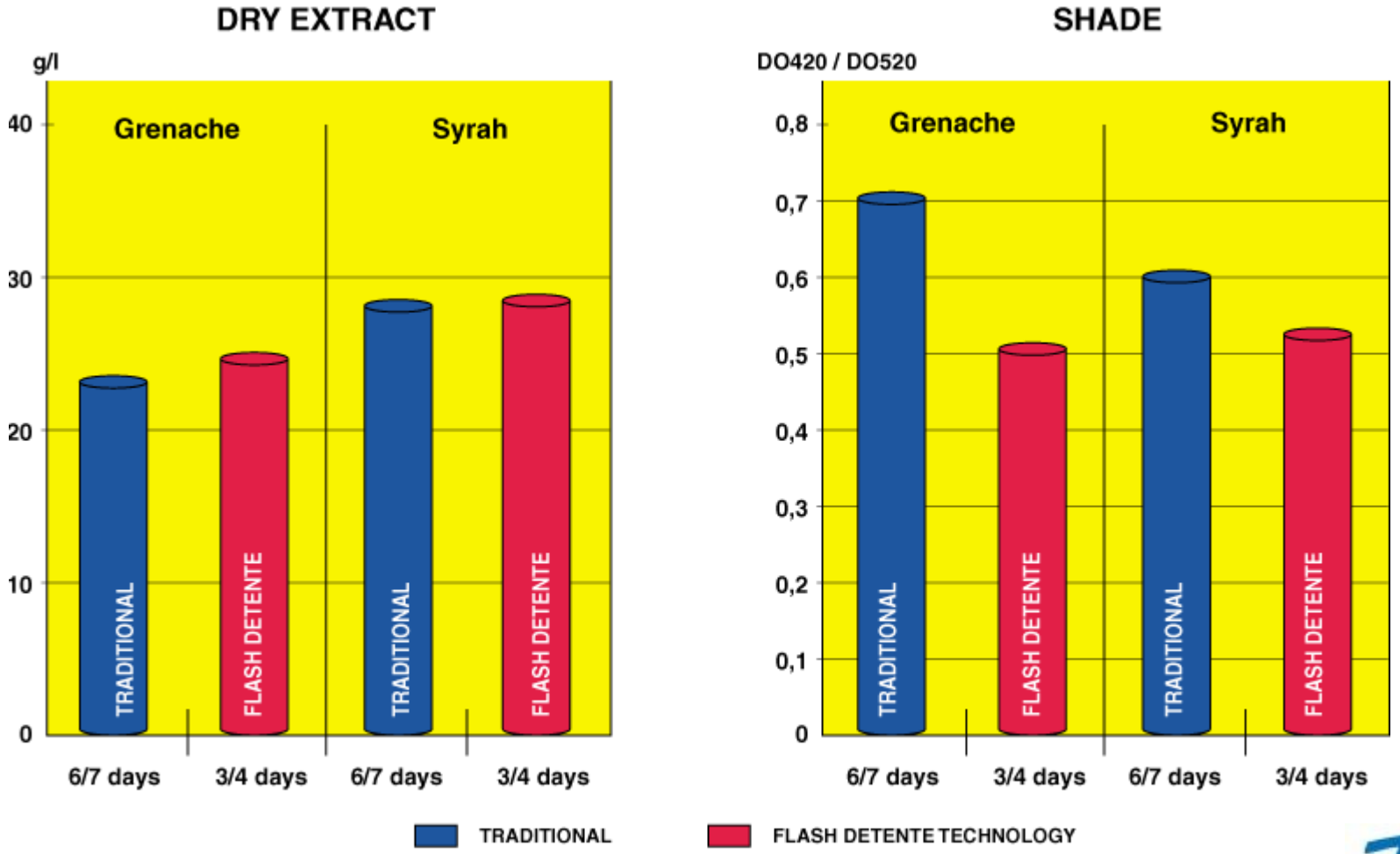
F.D.T. patented by Aurore Development and INRA

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

WINERY
VILLEDIEU - CÔTES DU RHONE

CASE STUDY



Analysis performed by the laboratory :
Institut Rhodanien - ORANGE (84) - FRANCE

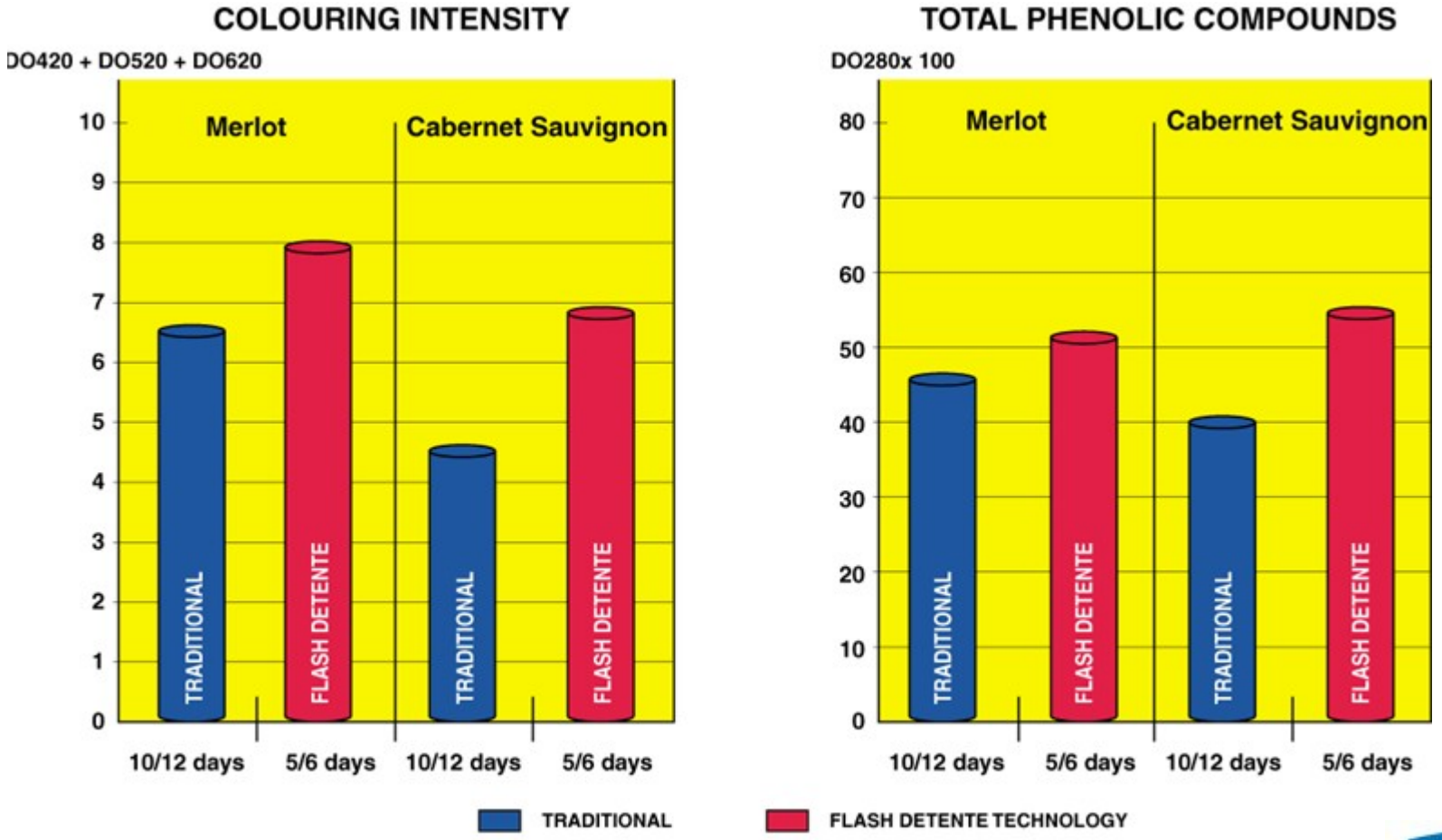
F.D.T. patented by Aurore Development and INRA

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

WINERY
SAUVETERRE - BORDEAUX

CASE STUDY



Analysis performed by the laboratory :
Ch. Ag. Gironde - CADILLAC (33) - FRANCE

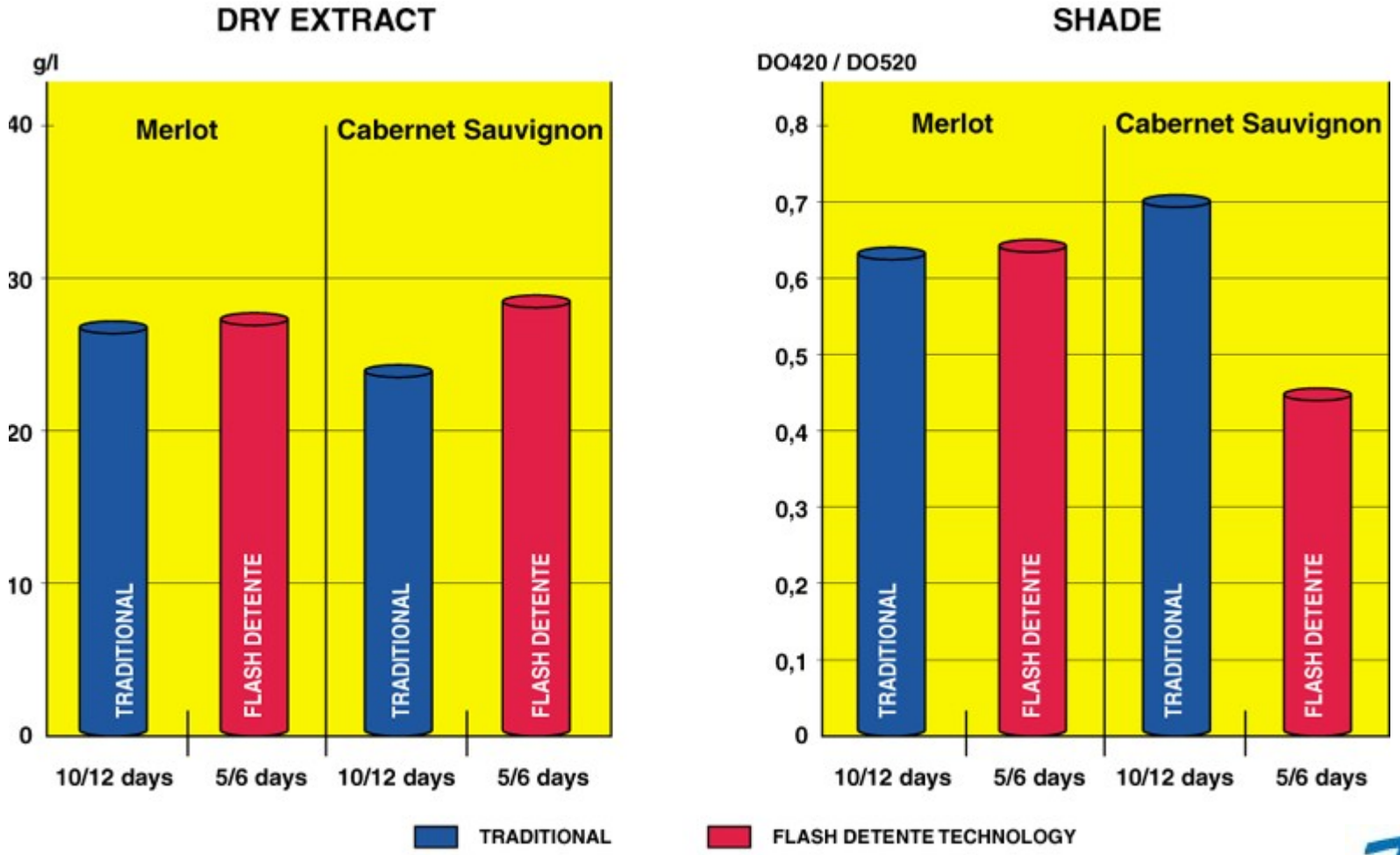
F.D.T. patented by Aurore Development and INRA

FLASH DETENTE TECHNOLOGY FOR RED WINE DEVELOPMENT

MAKING THE MOST OF GRAPES

WINERY
SAUVETERRE - BORDEAUX

CASE STUDY



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