

# New Methods in Wine Production

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**WITS**

WINE INDUSTRY  
**TECHNOLOGY**  
SYMPOSIUM

July 15, 2008 - The Napa Valley Marriott

# Take home messages:

- Get a DSP
- De-alc for flavor, not taxes
- Skill at the winery repays 10x in the market
- Use UF to make the most of your goodies
- Tartrate stabilize with electricity

# Re-discoveries now guiding enology:

- Wine is capable of macromolecular structure, which enhances wine's soulful "single voice."
- Post-fermentation treatment strongly influences structure.
- Texture derives from the wine's structural nature.
- Structure influences aromatic expression.
- Filtration and stabilization rob structure.

# Membranes in Winemaking

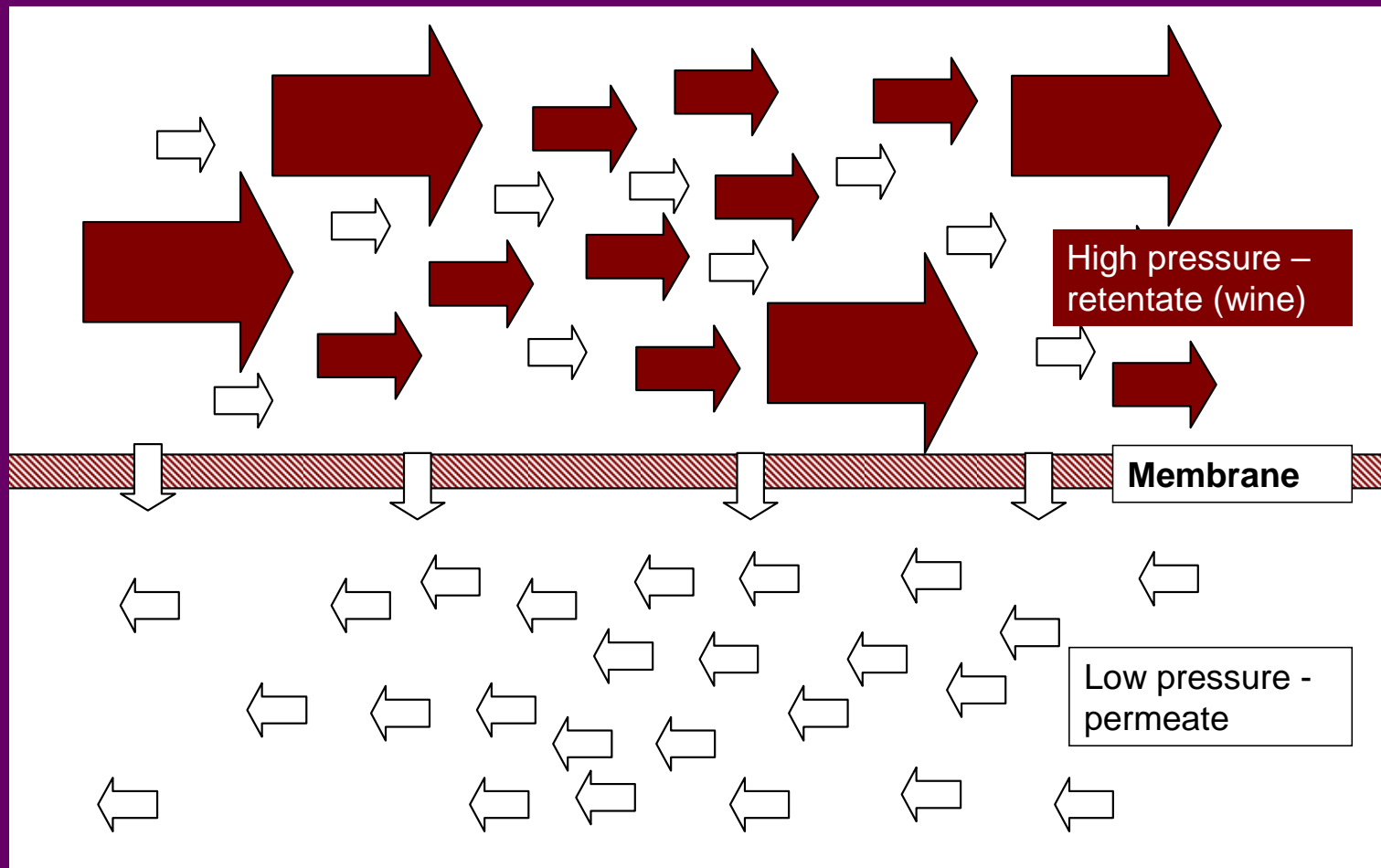
- Optimize maturity
- Clarification
- Phenolic management to enhance structure and eliminate waste
- Microbial stability
- Flavor extraction
- Energy savings
- Effluent-free wineries
- Promote Organic Wine Production

# What is Reverse Osmosis?



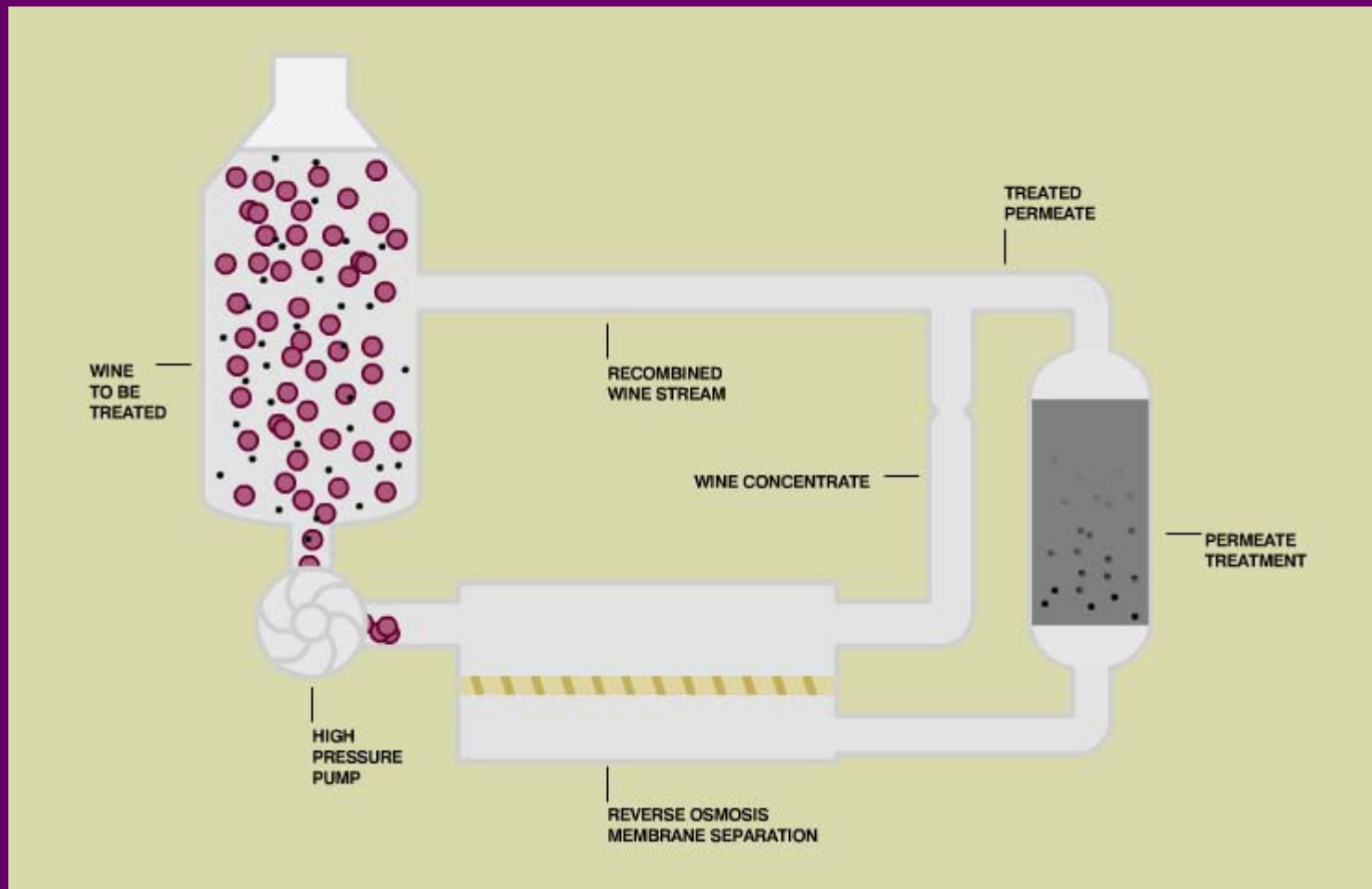
- “Liquid-phase pressure-driven separation process in which applied transmembrane pressure causes solvent movement of **“Flavor-proof membrane”** against its osmotic pressure difference.”
  - IUPAC Recommendations 1996

# Reverse osmosis:



# Mem-S-T-A-R

- Membrane
- Separation
- Treatment And
- Recombination

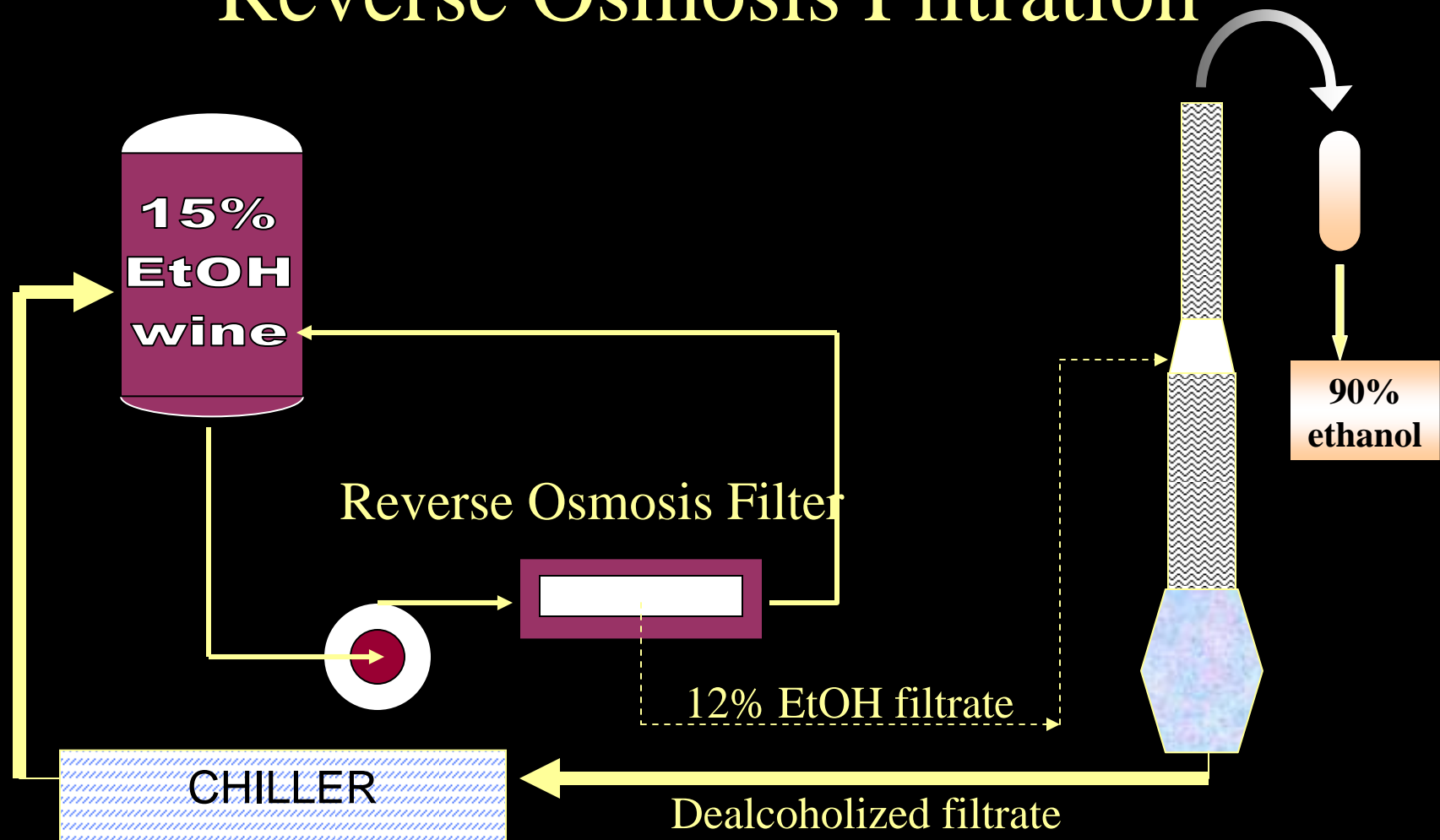


# Optimizing Maturity



**Grape Quality  
is  
independent of Brix  
!**

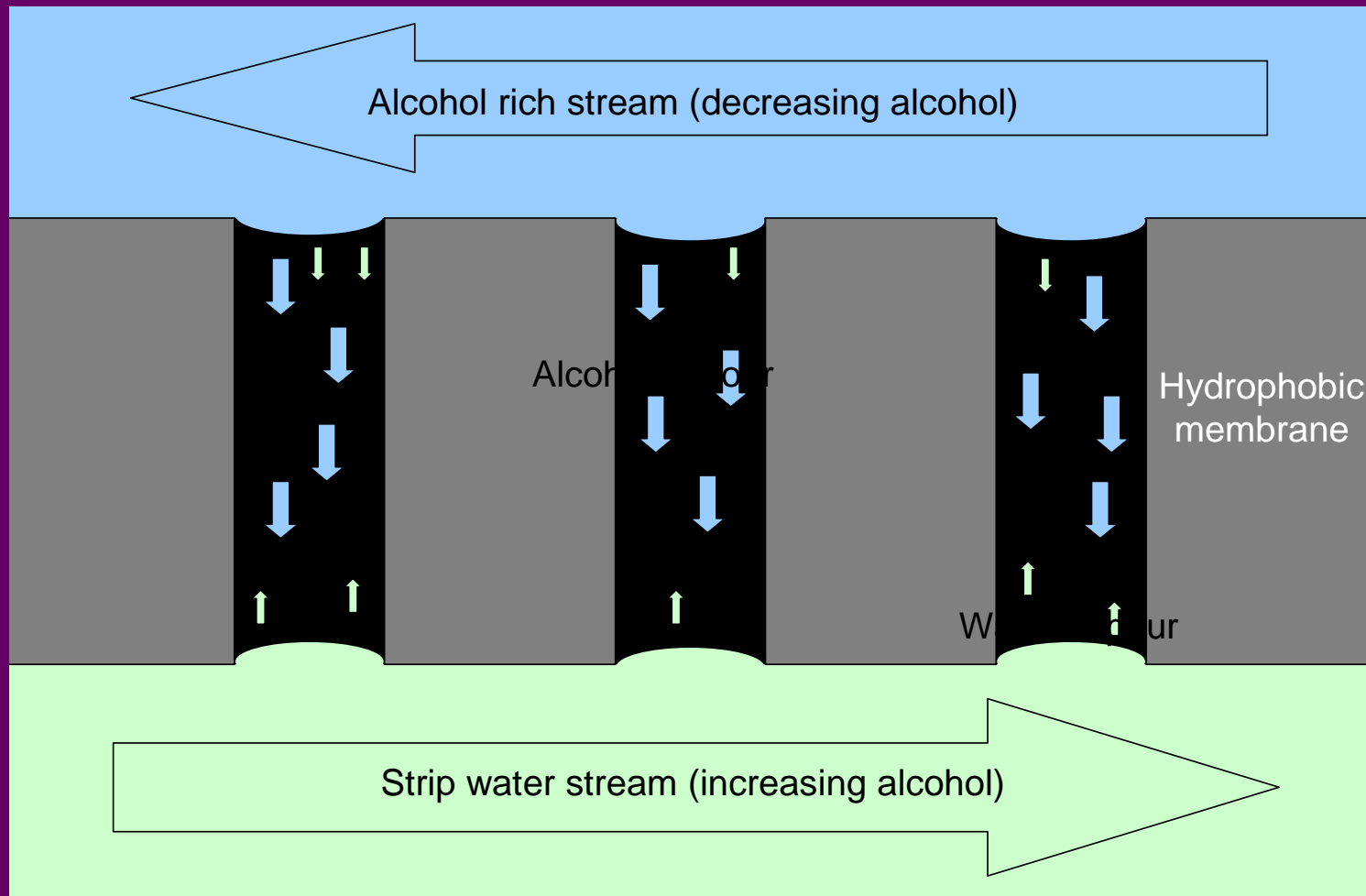
# Wine Alcohol Reduction via Reverse Osmosis Filtration



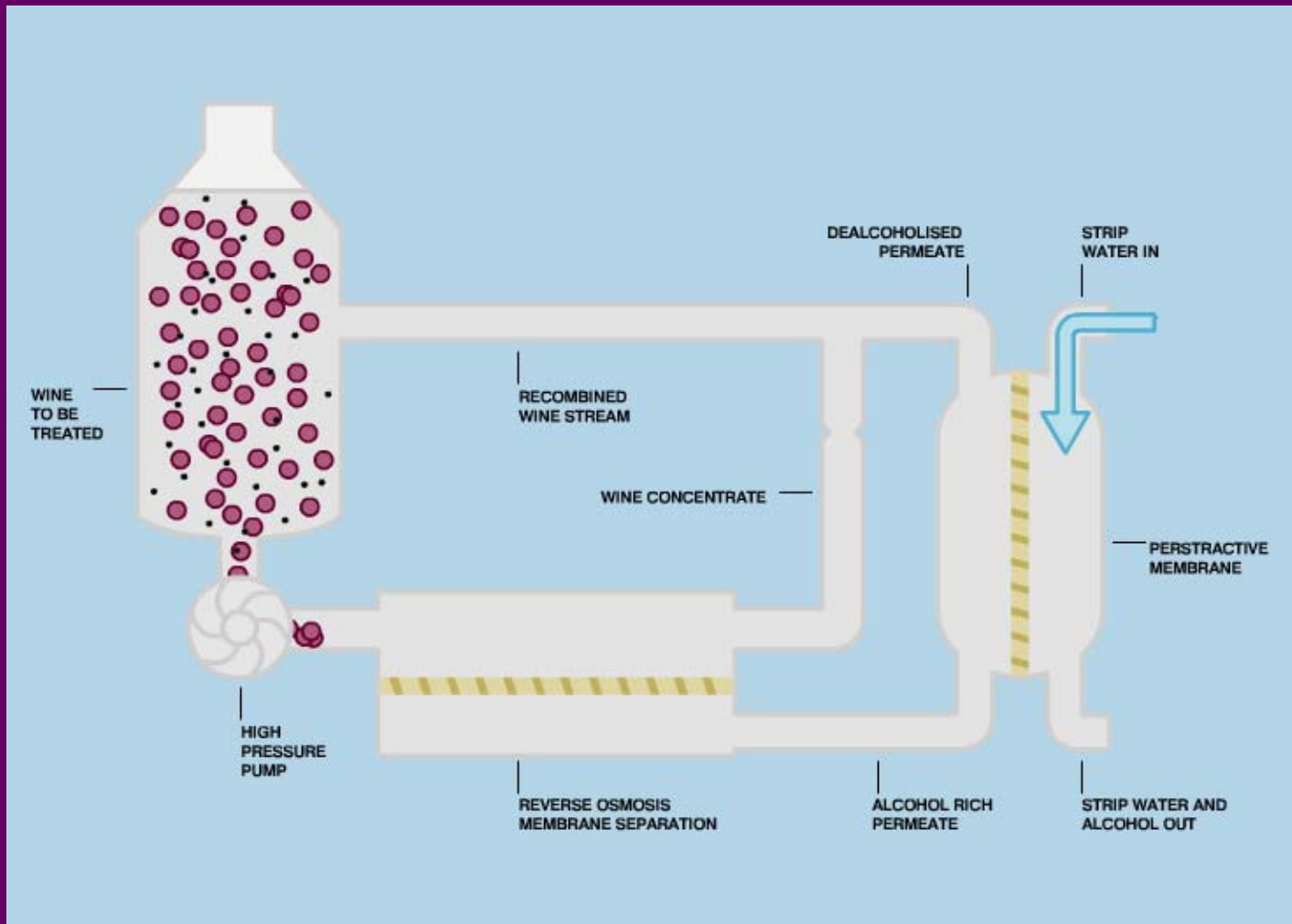
# Alcohol Reduction in an ideal world:

- **Wine processed entirely on-site**
- **No dilution or degradation of wine quality**
- **Minimum volume losses**
- **Easy 'sweet spot' determination**
- **Works on large or small lots**
- **No on-site distillation**
- **Simple compliance requirements.**
- **Preserves "Estate Bottled" designation**

# Osmotic Transport



# Alcohol Adjustment



# Memstar AA4-08



# MemSTAR System for Alcohol Adjustment

- 1. Create RO permeate containing alcohol.
- 2. Strip alcohol using osmotic distillation from permeate into tap water.
- 3. Recombine de-alcoholized permeate into wine.
- 4. Stripping liquid trucked away.

## *Which red wine technique are we using?*

### 1. Australian winning formula: “makes itself”

- rich and generous
- broad flavor expression
- “Friendly” style (drink now)

### 2. Classic French winning formula: “élevage”

- distinctive and visceral
- profound, deep flavor expression
- “Reserve” style (improves with age)



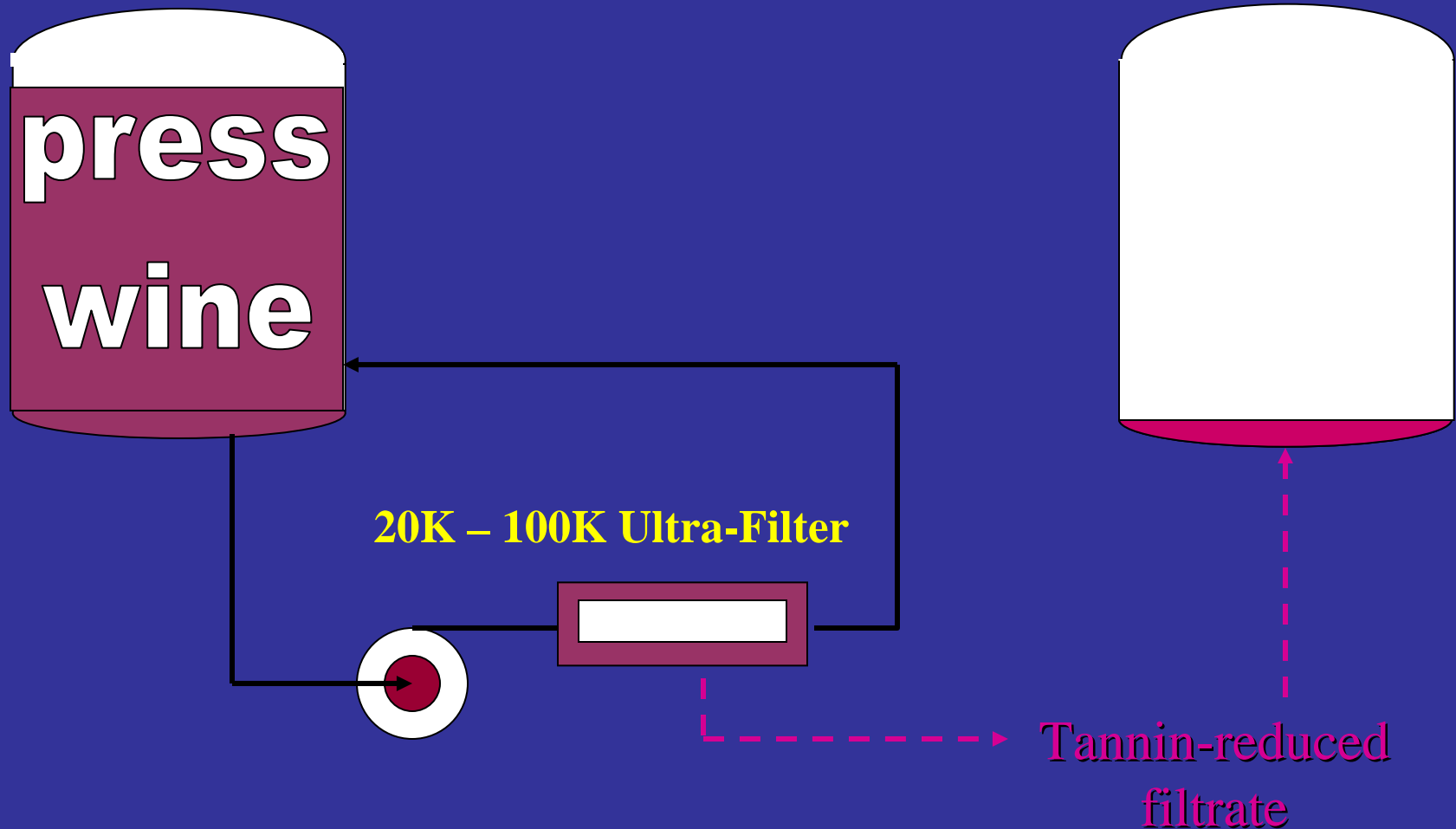
Phenolic Management

via

Ultra-Filtration

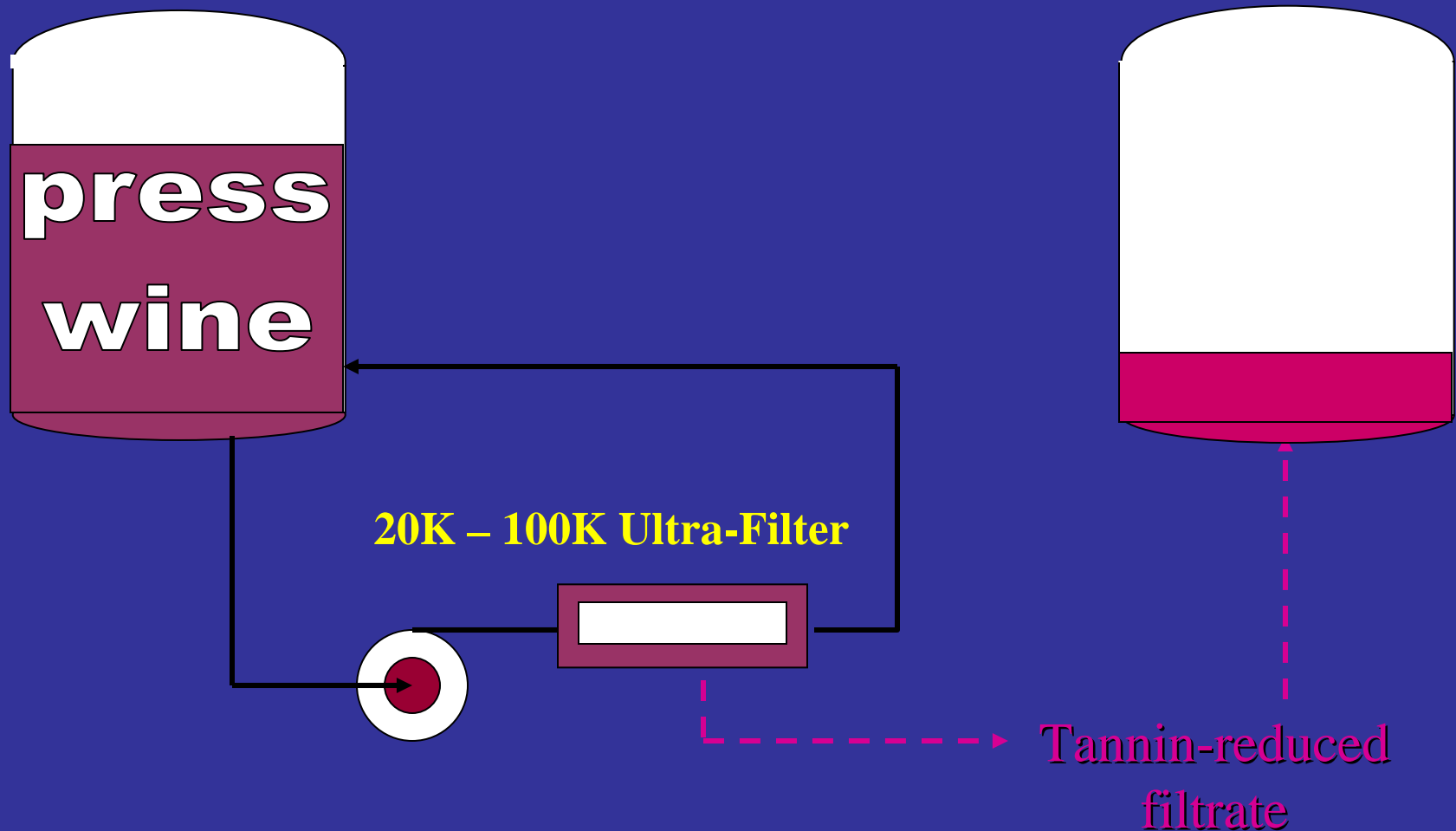
# Ultra-Filtration of Red Press Wine

(alternative to gelatin fining)



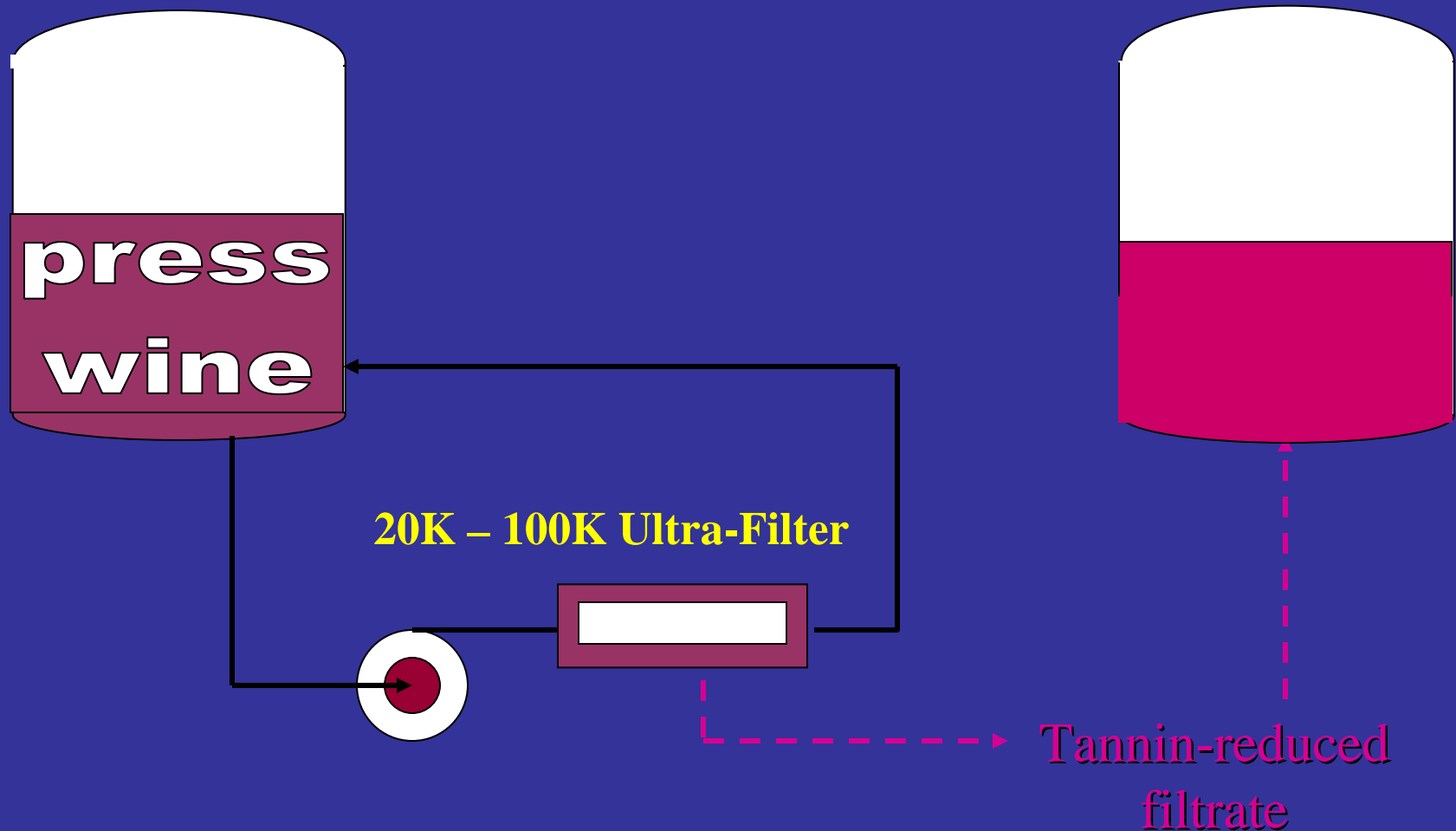
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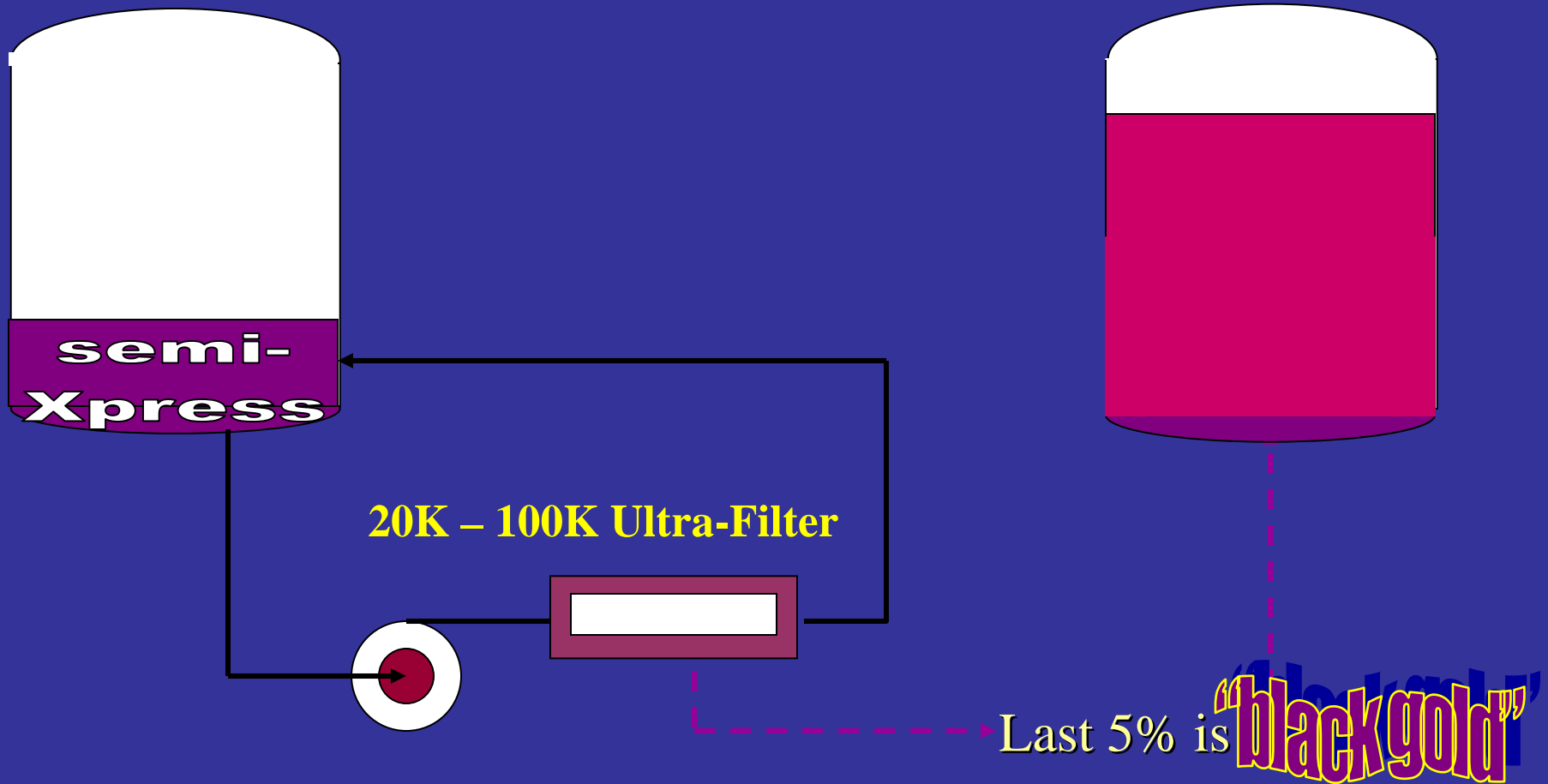
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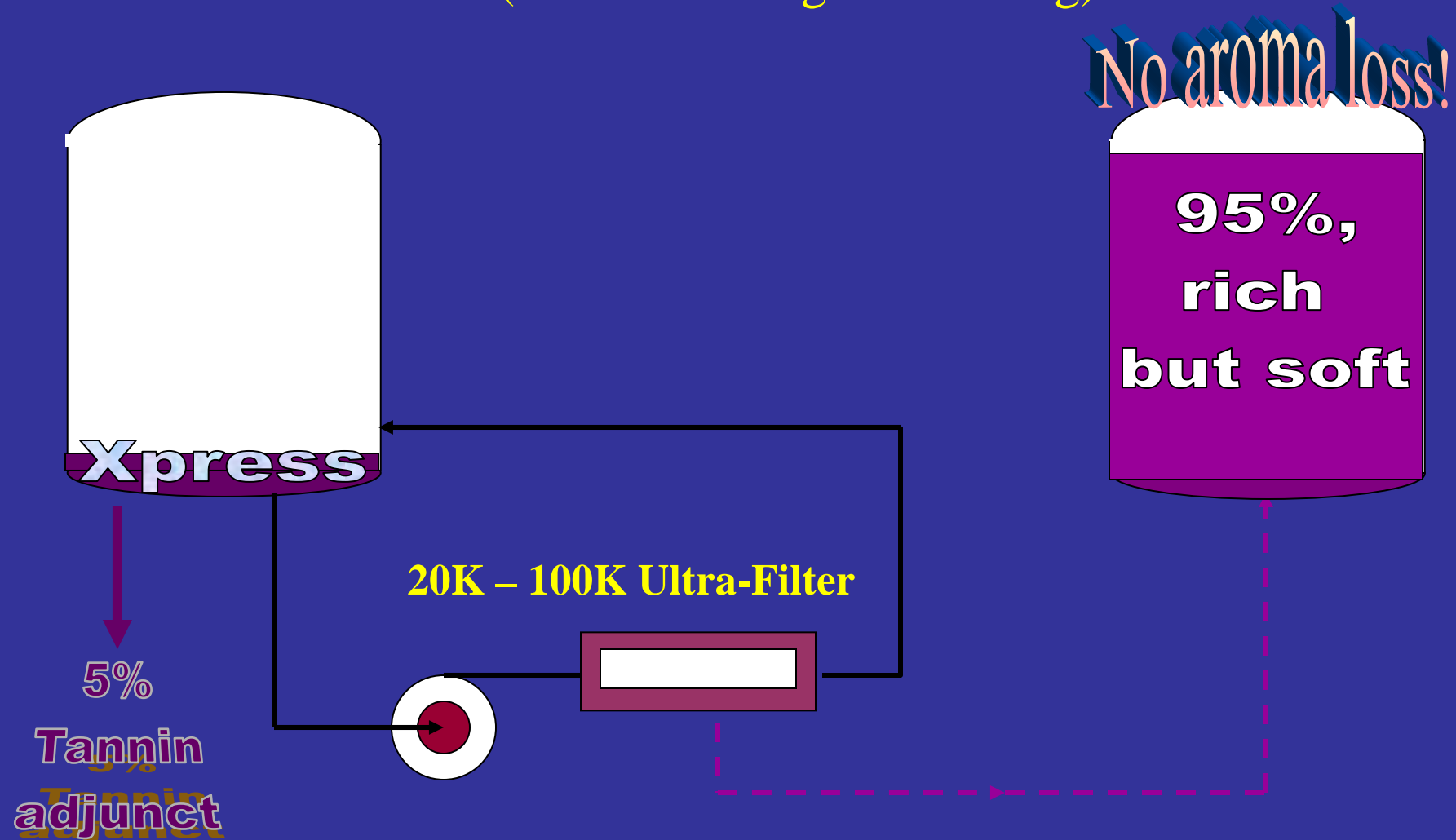
# Ultra-Filtration of Red Press Wine

(alternative to gelatin fining)



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(alternative to gelatin fining)



# *Red Xpress*

**Enhances richness  
of weak reds**

# *Red Xpress*

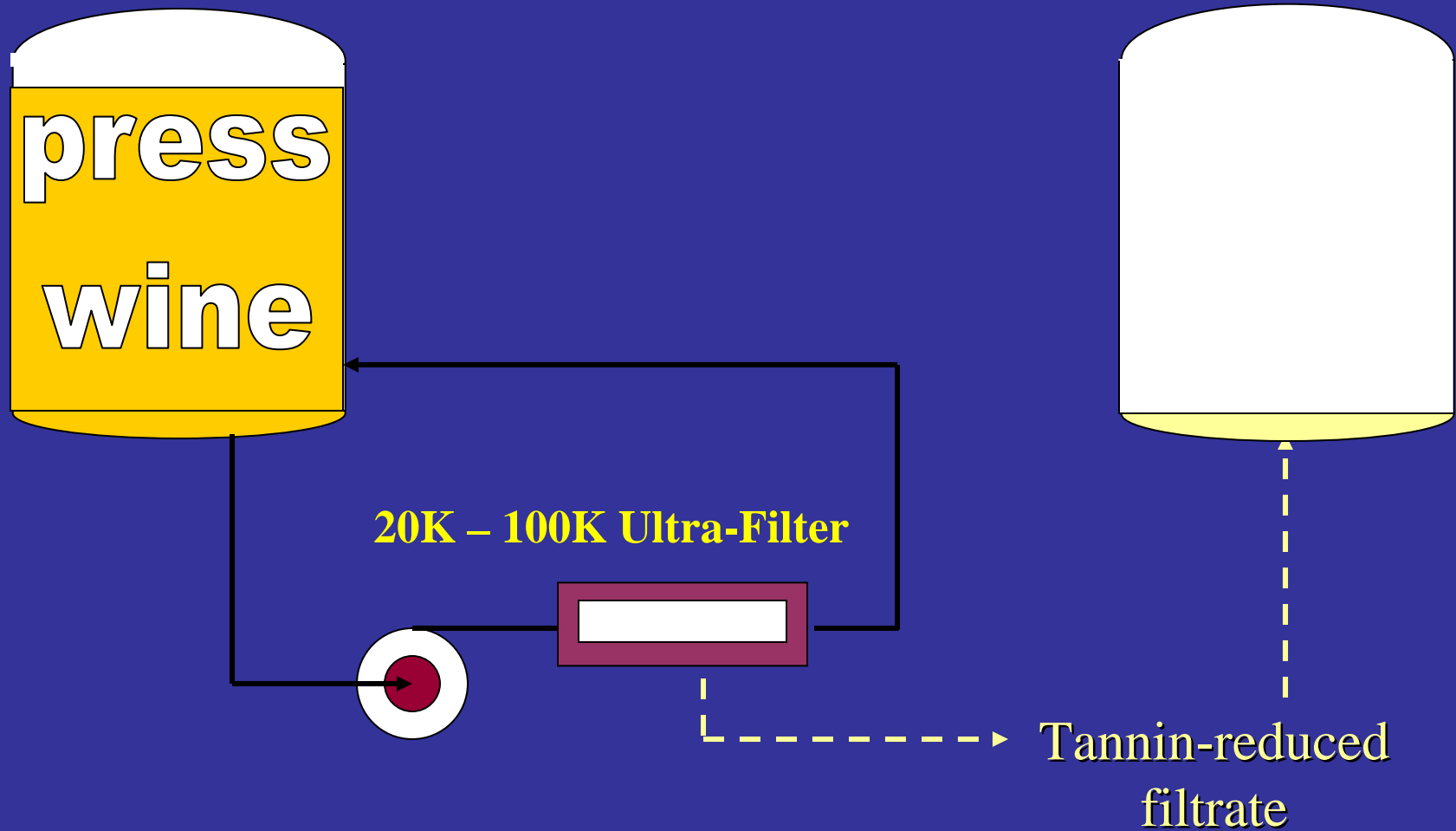
**Transfer the tannin and color**

**- Not the varietal volume!**

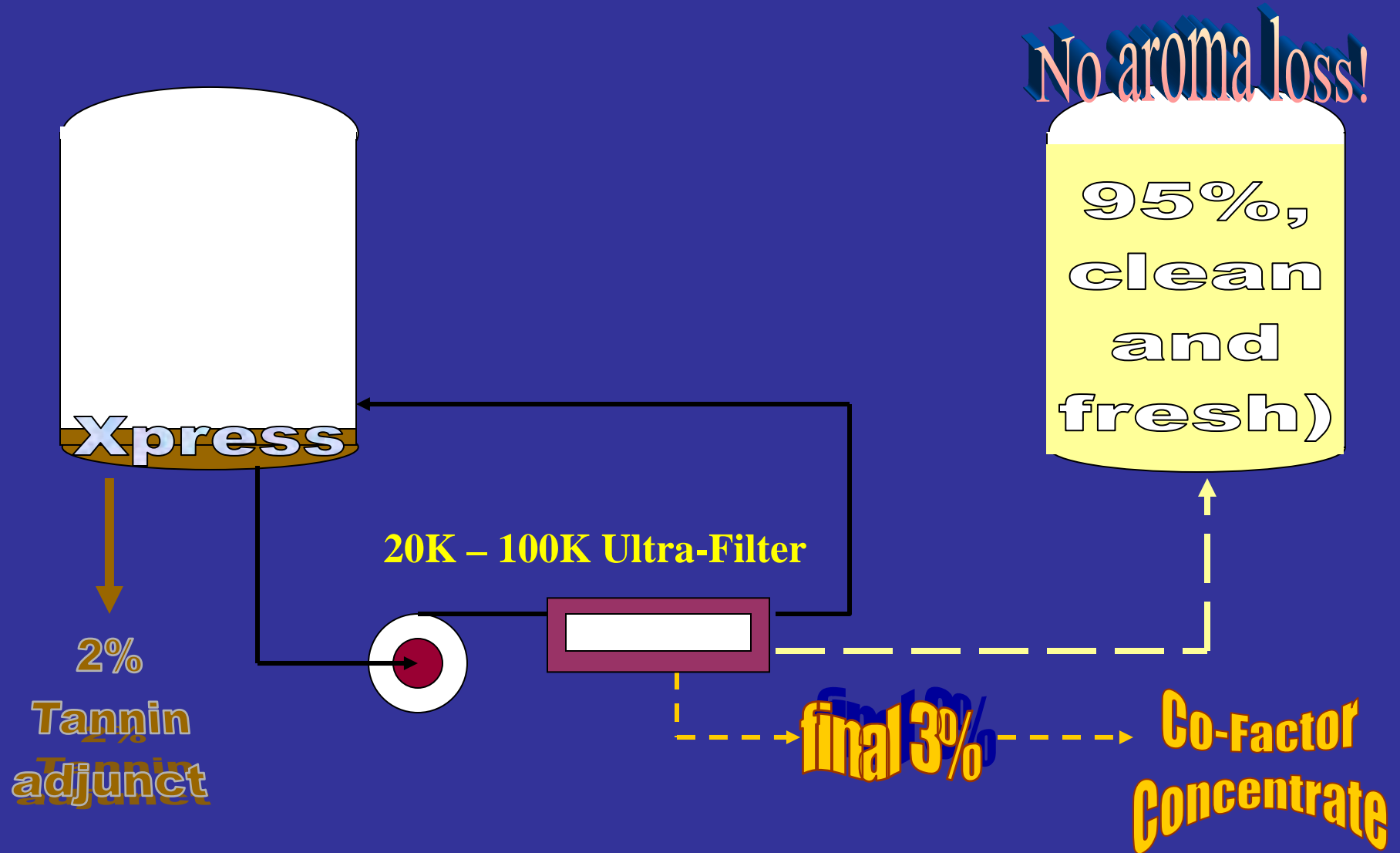


# Ultra-Filtration of White Press Wine

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# Ultra-Filtration of White Press Wine



# *White Xpress*

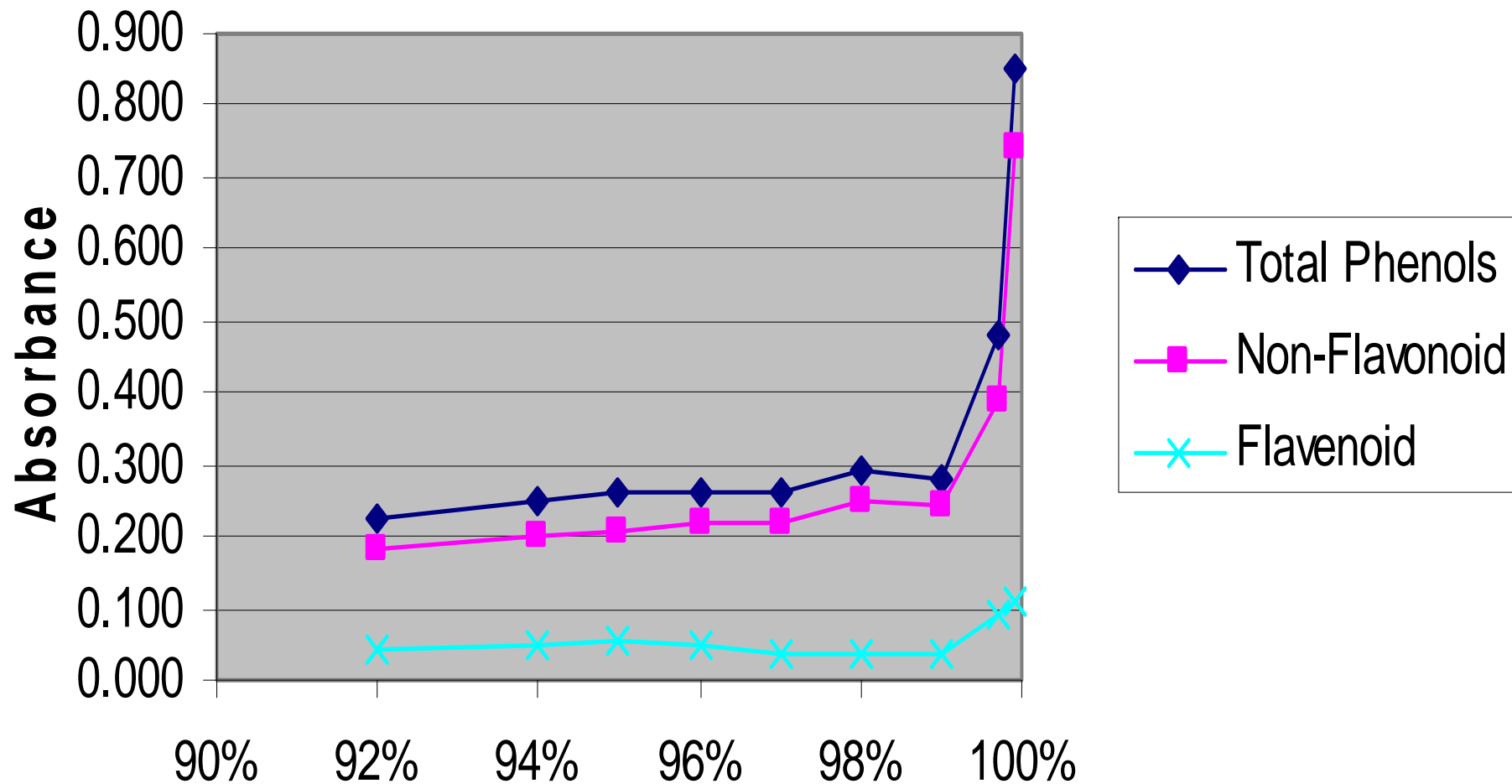
**All-grape tannin for  
reds of good color**

# Co-Factor Concentrate

Add to fermentations

to promote flavor and color extraction

## Ultrafiltration Permeate of Pinot Noir Press Wine



# Ultra-Filtration Quality Program

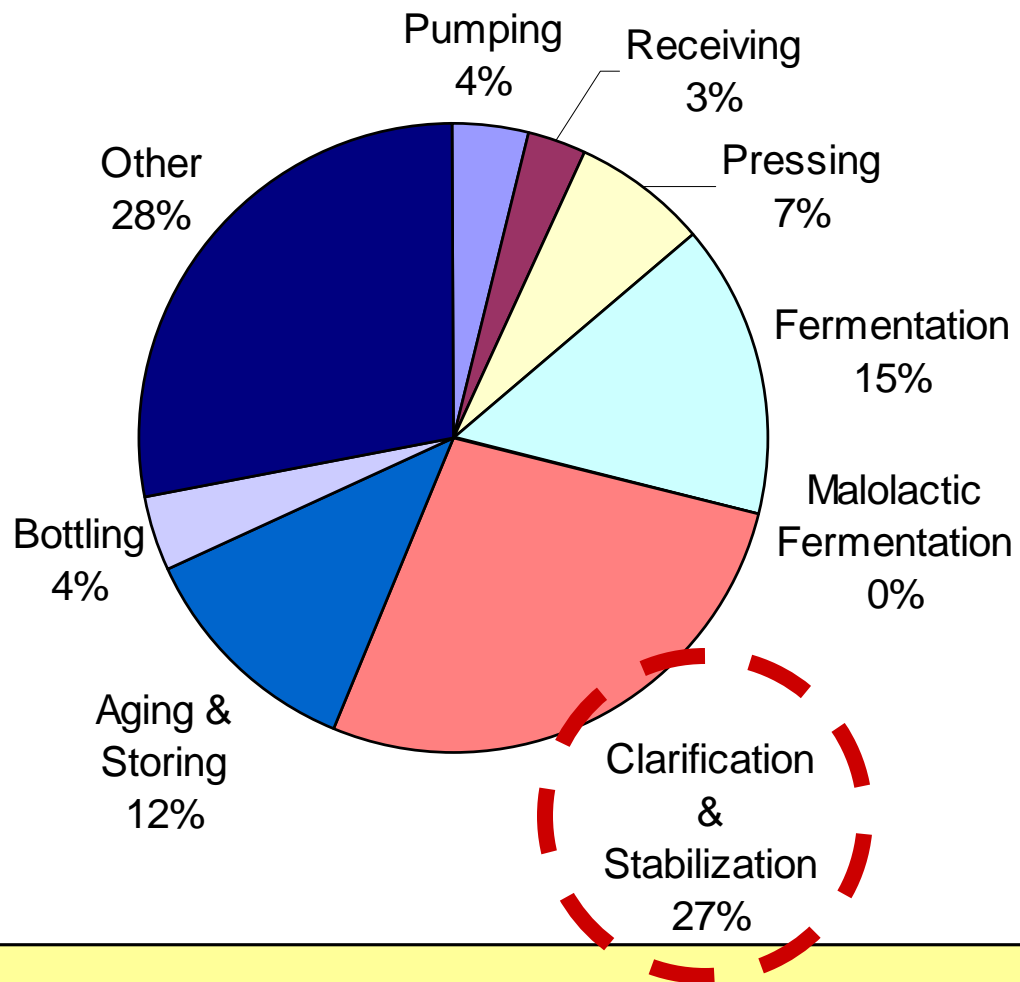
- Harvest tannin from any varietal to balance high value varietals like Merlot and Cabernet
- Maximize yield and quality of press fractions
- Replace powdered tannins and oak tannins with grape tannins from your own wines
- Produce economical co-factor concentrates in-house to optimize skin extraction

**Energy**

**Savings**



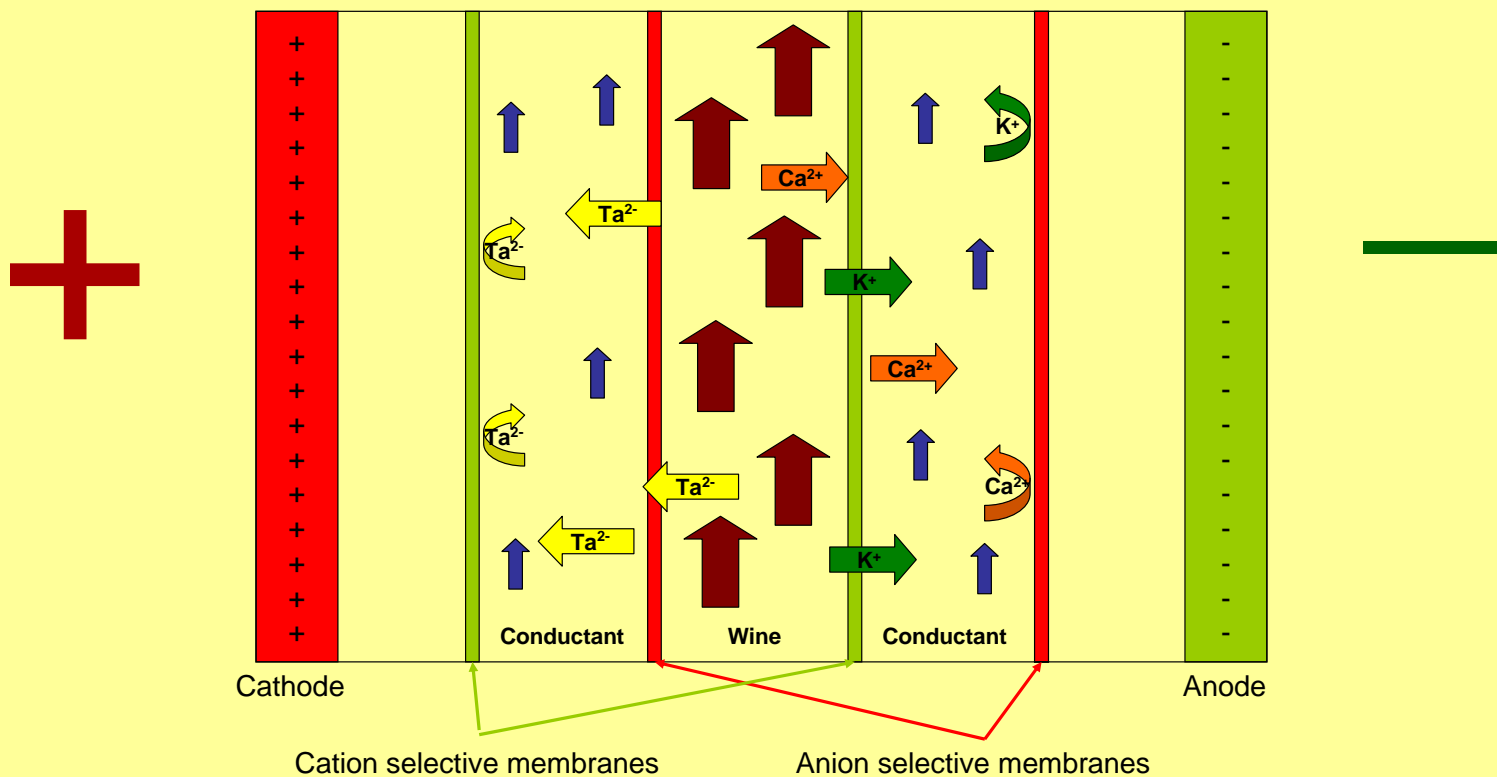
## Electricity intensity - Red Wines



From : **BENCHMARKING AND ENERGY AND WATER SAVINGS TOOL FOR THE WINE INDUSTRY**  
LBNL-3184, May 2005

# Cold Stabilization via Electrodialysis

Electromagnetic attraction and ion-permeable membranes separate potassium and bitartrate from wine *in-line*.



**Improves wine flavor and pH**

**Saves 80 - 90% of energy costs**

**Direct from barrel to bottle**  
**100% reliable**



**Mobile Unit  
for small wineries  
and for testing**



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Thank you

for your kind attention.