Filter Practices that Protect Aroma Profile

Increasing Colour and Stability of Pinot Noir

Aspects of Grape and Oenology Technology on Aromatic Whites

Sparkling Blanc de Noir Production

Dr. Ilona Schneider
Production of depth filter sheets

Production process for depth filter sheets and stacked disc cartridges
Components and their characteristics

- Finely fibrillated cellulose fibers
- Kieselguhr
- Perlite
- Synthetic resins based on polyamine/polyamide
- large internal surface area
- high clarifying sharpness
- voluminous pore structure
- wet strength, adsorption effect
Particulate charge distribution of a depth filter sheet

- Cellulose
  ➞ has an anionic (-) charge or potential, i.e. particles with a positive charge are adsorbed

- Diatomaceous earth
  ➞ has an anionic (-) charge

- Resin constituents
  ➞ have a cationic (+) charge

- Depth filter sheet up to and including Steril 40
  ➞ have a low cationic (+) charge

- Finer depth filter sheets
  ➞ have a highly cationic (++) charge

- Yeasts and bacteria
  ➞ can have both positive and negative charge, depending on strain
Depth filter sheet mechanisms

• **Surface filtration**
  • Separation of particles at the surface due to their size

• **Depth filtration**
  • Separation of particles and microorganisms within the internal pore structure

• **Adsorption**
  • Separation of particles and microorganisms due to different charges of the depth filter sheet components and the particles and microorganisms to be separated
Mechanisms of Sheet Filtration

Surface filtration

Adsorption

Depth Filtration
Properties of Depth Filtersheets

- Mecanical sieving effect
- Retention of particles larger than pores on the inlet side of the sheet
- Deformable, slimy particles, i.e. gelatine, alcoholic extracts of drugs and herbs (macerates) block the surface very fast => quick decrease of throughput

Surface filtration
Properties of Depth Filtersheets

- Retention of smaller particles and colloids
- Particles basically smaller than the pores of the sheets
- Retention is based on electrokinetic effects (Zetapotential)
- Adsorptive processes (no mechanical retention)
Properties of Depth Filtersheets

- Three dimensional inner structure based on high porous Filter Materials cellulose; D.E.; perlite
- Retention of particles in the internal matrix of the sheet (depth filtration)
- Pore volume of about 75-80%
  1 m² filter area and 4 mm thickness result in 3 Liter haze volume
- Especially retained particles: activated carbon, crystalline hazes, yeast
Properties of depth filtersheets

Adsorption

ZETA POTENTIAL
BECOPAD Performance

Adsorptive filtration with Activated carbon sheets

Sterile filtration
Germ-reducing Filtration
Fine filtration
Clarifying filtration
Coarse filtration

Precoat filtration (Kieselguhr, Perlite, Cellulose) with support sheets
BECOPAD Components

Only certified celluloses

No synthetic fibers

Targeted application of a special cellulose based on the special bepure processing method

No inorganic components

White depth filter sheet with outstanding purity
Compostable according to:

ISO 14855
DIN EN 13432
BECOPAD
Colour/Visual Appearance

Standard depth filter sheet

BECOPAD
BECOPAD
Adsorption of Colorants

Adsorption of colorants (laboratory trial/standardised solution)

- BECOPAD - low adsorption
- Standard range (BECO KD 10)
- Wine range (BECO Steril S)
- Beer range (B 150)
- CPI range (PR Steril 40)
- CPI range (PR Steril S 80 UP)

Adsorption of colorants (g/m²)

0.0   0.5   1.0   1.5   2.0   2.5   3.0   3.5   4.0

0.10
0.25
0.25
2.8
2.8
2.8

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BECOPAD
Adsorption of Colorants

Depth filter sheets backwashed with water
White wine filtration following a red wine filtration

KD

BECOPAD 350
Detection of drip losses BECOPAD vs. conventional depth filter sheets [lab test]
**BECOPAD**

**Wet strength**

- Comparison of removing BECOPADs to depth filter sheets
- high wet bursting strength $\rightarrow$ significantly improved handling

„folding-test“
BECOPAD
Microbiological Retention Rate

LRV > 7

diminishing LRV

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BECOPAD
Microbiological Retention Rate – Wild Yeast

• Hanseniaspora uvarum/Kloeckera apiculata: volatile acid, high germ counts in the must, very active at the beginning of alcoholic fermentation

• Smallest wild yeast known in wine, therefore „worst case“
BECOPAD
Microbiological Retention Rate – Bacteria
Pediococcus damnosus:

germ reduction rate of Pediococcus damnosus [lab trial]

0.5 – 1.0 µm
BECOPAD
Microbiological Retention Rate – spontaneous yeast

- Brettanomyces bruxellensis / Dekkera bruxellensis

2.550.000

1,5 – 2,0 µm
0,7-0,9 µm

Brettanomyces spp. (cfu/ml)

Begin
1,5 bar differential pressure
BECOPAD
Experience for Filter pressing

• Standard layers (40 format) are usually compressed to only 1.2 to 1.4 mm

• the BECOPAD should be compressed to approximately 0.8 mm.
  => this means that a disk package with for example 100 plates, could be 4 to 6 inches shorter

• Filter with hydraulic piston and cylinder are normally closed better as filters, which are on a spindle and pressed also by hand
Practical issues
Practical issues
Practical issues
Practical issues
Practical issues
Filtration scheme
Cooperative with Pre- and Membrane Filter cartridge before bottling

Advantage:
• Sterile Filtration with „police filter“
• Bottling of different wines (National and International)
• Excellent protection for membrane filter cartridge
• BECOPAD 115 C: good filter index and regeneration
Filtration scheme

Bottler on truck BECOPAD 115 C and membrane filter cartridge before bottling
Base wine and premium wine

Premium wine

BECOPAD 350/
BECOPAD 270

Bottling

BECOPAD 220/
BECOPAD 170

Base wine

BECOPAD 350/
BECOPAD 270

BOTTING

BECOPAD 115 C

Bottling

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