CONTINUOUS AND BATCH FLOTATION SYSTEMS FOR GRAPE JUICE CLARIFICATION

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Why do we need to clarify grape juices?

To remove all the non-desired compounds from grape juices before fermentation!

Processes being regularly in use:

- Cold Settling
- Filtration (with/without filtration ads)
- Centrifugation
- Flotation
Flotation involves phenomena related to the relative buoyancy of objects.

- DGF, dissolved gas flottation
- IGF flottation gas flottation, induced gas a process that clarifies liquids by the removal of suspended matter.

Due to the surface tension the suspended solids being attached to the bubbles that are induced into the liquid are carried out on the surface.
FLOTATION:

STEPS IN WINE INDUSTRY:

a) Enzyme treatment (pectinases) (preferably in line)

b) Dosage/ non-dosage of clarifying agent (gelatine, bentonite, PVPP, etc…)

c) Saturation with gas-gas (N2) at 5-6bar is mixed with the juice, the bubbles that are formed surround the particles in the grape juice (alone or formed with the clarifying agents) and brings them to the top of the flotation tank

d) Surface removal and extraction (continuous)/rack discontinuous
**FLOTATION: FLOTATION AND WINE STYLES**

**DEFINING WINE STYLE**

**Oxidative style (N2 for flotation)**
- questionable,
- pinking effect,
- quick maturing,
- disjoint wines,
- body of wine
- reductivity of wine

**Reducive style (N2 for flotation)**
- fasten the process
- retention of primary aroma
- reduce the electricity costs
- prevent from oxidation and color instability
- lower the amount of solids
- improve the effectiveness of the process

**Using air for flotation?**
**Quality or cheap wines?**
FLOTATION:

FLOTATION STEPS:

Enzyme treatment (coloids and viscosity)

Dosage/ non-dosage of clarifying agent (gel, bent, PvPP etc..)
CONTINUOUS FLOTATION:

Continous Flotation System
300HL/H
FLOTATION:
CONTINUOUS FLOTATION:
FLOTATION:
DISCONTINUOUS FLOTATION(1):

DISCONTINUOUS FLOTATION SYSTEMS WITH EXPANSION VAT
DISCONTINUOUS FLOTATION SYSTEMS WITH EXPANSION VAT
FLOTATION:

DISCONTINUOUS FLOTATION:

Discontinuous flotation in recirculation or not?

What about the temperature?
FLOTATION:

WHAT ABOUT PRESSES:

Phenols?

Free run/pressings?

Oxygen?

Solids?
FLOTATION:
PRESSES AND OXYGEN:

CONDITIONS IN GRAPE JUICE:
- HIGH CONCENTRATION OF REDUCING SUGARS: >20 % w/w
- LOW TEMPERATURES OF FERMENTATION ~13-14°C
- LOW CONCENTRATIONS OF YAN (<140 mg/L)
- LOW pH
- LOW CONCENTRATION OF DISSOLVED OXYGEN
- ADDITIONS OF SO2
- RESIDUES OF PESTICIDES AND MYCOTOXINS

WHAT HAPPEN IN THIS CONDITIONS:
- STUCK OR SLUGISH FERMENTATIONS
- PRODUCTION OF OFF-FLAVOURS
- REDUCTIVE CONDITIONS
- WINES OF LOW QUALITY

H2S PRODUCTION
Cold Settling

- almost 24h;
- energy for colling/heating;
- oxidation (colour);
- oxidation (primary aroma);
- storage room;
- non effective add. of clarif.and enzymes;
- coloid problems;
- problems with roten grapes;
- higher amounts of solids; (loss of product)

Flotation

- 2h, in fermentation;
- low energy consumption;
- low or noone oxidation (colour);
- retain primary aroma;
- less storage room; neded
- efective add. of clarif.and enzymes ,in line ;
- prevent coloid problems;
- prevent problems with roten grapes;
- lower amounts of solids; (loss of product)
CHEERS!!!

Cheers
Salute
Prosit
Gezuar
Genatz
Zivjeli
Viva
Ganbei

Nazdravlje
Noroc
Do
Kampai
Kippis
A vossa
Pripitek
L’chaim
Presentation context

• This presentation was given as part of a workshop on grape and juice processing equipment convened by the Australian Wine Research Institute (AWRI) at the 15th Australian Wine Industry Technical Conference in July 2013.

• The main intention of the workshop was to provide attendees with information on equipment that is new or unusual or that has not been widely used in Australia.

• This and the other presentations given were prepared by equipment suppliers, not by AWRI, and AWRI does not necessarily endorse the views presented. Before the purchase of any major winery equipment, AWRI recommends appropriate background investigations being undertaken; including visits to facilities already using similar equipment, consultation with independent experts and the performing of in-house trials.

• AWRI received no payment from suppliers for the inclusion of their equipment in the workshop.

• For any further details on the workshop please contact AWRI Senior Engineer, Dr Simon Nordestgaard, by email at simon.nordestgaard@awri.com.au.