Pressing quality juice

Paul Baggio
Product development coordinator and director
Australian Winemakers

'Technology', the word is bandied around everywhere. 'Fast adapters', 'early adapters', everyone wants to be on board the techno wave.

The poor old membrane bag press seems to be under attack by the technorati. With words such as 'intel programming' and 'inert' juice extraction being bandied about by various creative press sales persons, we thought it was time to have an in-depth look at some of the 'techno-babble'.

The basic principle of white winemaking is that polyphenol oxidase enzymes exist in grapes.

These enzymes exist within the cell structure of the berry and held inactive to a large part until the grape berry is ruptured.

On crushing, concentrations of these polyphenol oxidase enzymes leach into the separating juice.

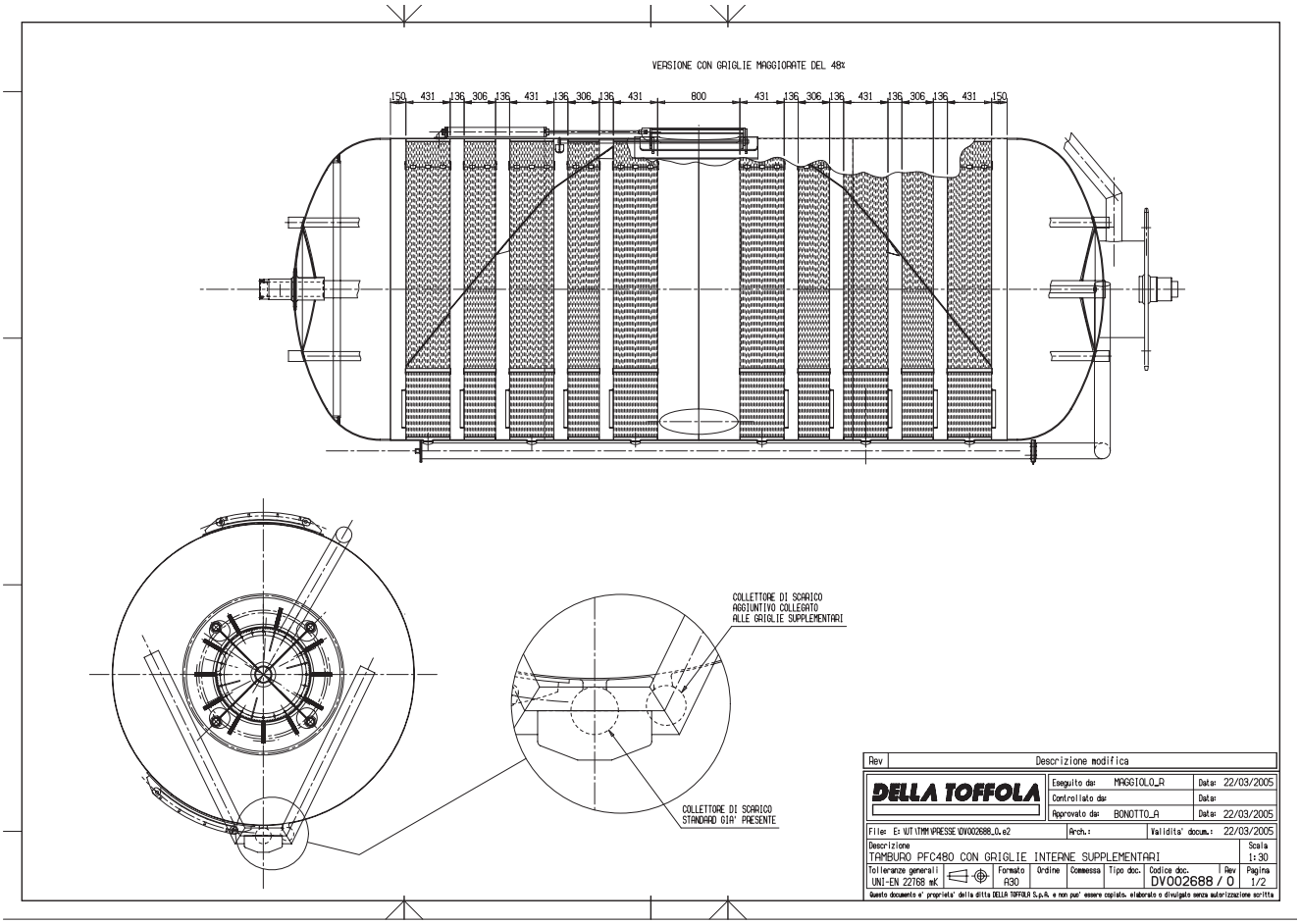
It is on exposure to oxygen that these enzymes create browning fractions.

In simple terms, a bag press design can be viewed by two distinguishing design philosophies:

- Designing a system that tries to stop oxygen combining with the polypehnol oxidase enzyme.
- Providing a design that tries to accelerate the separation of juice from the grape skins whereby reducing the potential incidence of enzymes creating oxidation.

Central membrane presses, with their central bag, provide for near 90% of the inner wall of the press tank surface area to be covered with drain screens. This way juice separation is maximised from the loaded in, crushed or whole bunch grapes.

Side membrane presses, due to half the tank press surface area ▸



being covered with the membrane bag, and then with the remaining tank surface area lost to load in hatch doorways, can only provide on average no more than 22 – 28% of the tank press surface area for juice separation.

If we look historically at sparkling wine production, well recognised as a winemaking process that sparkling base must have the lowest browning fractions of all juice bases, the logic that dictates the sparkling wine press process is to provide for the quickest separation of juice from the grape berry.

Thus with sparkling wine production the production process of choice is to whole bunch press and use traditional sparkling basket presses.

Sparkling wine basket presses are traditionally designed with low height staves, and drain screen bases on the drain plate.

The focus for winemakers making sparkling wine base is to provide for accelerated juice separation from the grapes.

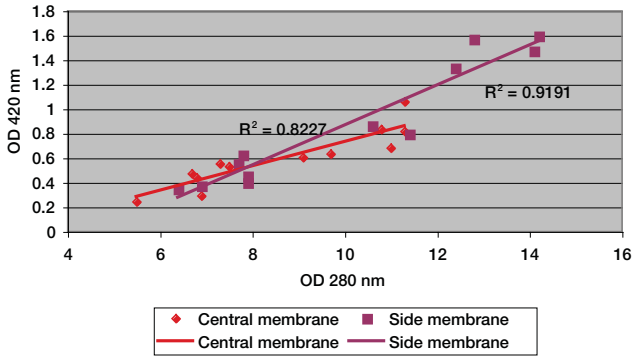
The design of central membrane presses is based on this traditional champagne press philosophy to ensure maximum separation of juice from grape berries.

It is clear that whole bunch processing is not cost-effective as a standard winery process, the yields are too low and the press cycle times typically too long to make whole bunch pressing cost effective.

Yet why do winemakers persist with side membrane press designs?

Some years back extensive work was conducted by the University of Adelaide on the extraction of polyphenol concentrations by comparative side and central membrane bag presses.

The principles, as understood by winemakers many centuries ago, is that a press design that provides for faster separation of the extract juice from the grape will ensure the lowest concentrations of



browning fractions and in turn provide for a lower oxidised ferment base for the winemaker.

Only central membrane press design inherits the traditional press separation process logic.

Does inert gas blanketing the press tank environment provide similar results? Many issues surround this process.

Most winemakers would recognise that a tank full of gas will, in fact, retard the flow of juice being able to flow out of the press.

Therefore, for a tank press to be made inert it needs to be continuously pumped in with inert gas and the gas needs to be continuously pumped out with oxygen - normally the oxygen is in-fed in the form of back pressure from open throat pumps feeding in from the destemmer crusher.

If the tank press is held in any vacuous state, extracted juice will not be allowed to separate from the press.

Creating a 'reductive' pressing environment presents a number of complications.

Is it worth the effort to employ inert gas systems? Is the exercise academic more than a practical winery process?

With most winemakers agreeing that good winemaking is far more 'holistic' these days, the press is recognised as important but only one component making up many along a path.

To view quality winemaking in terms of just the press is limiting.

The chemistry involved with polyphenols is not as simple as some press suppliers present.

By exposing polyphenols early, winemakers suggest that it is better to treat them early.

Very reductive winemaking processes such as inert gassing a tank press, in most instances only ignores the potential problems of oxidation.

Keeping polyphenols dormant, until eventually oxygen somewhere downstream, creates the real potential for bigger problems in the resultant wine.

Many winemakers agree that it is often easier and better for the end wine quality, for fining oxidation solids early in the juice stream than at the end.

To have the press ignore polyphenols potentially sees the problems exponentially grow in wine.

Can a modern day winery eliminate oxygen throughout the complete production process? Absolutely impossible most winemakers would say.

As the winery grows in size and capacity, it remains clear that achieving complete reductive winemaking is near impossible.

Modern day centrifuges alone add 4-5% dissolved oxygen, hoses and fittings are known as a major problem for oxygen pick-up, and then of course there is the process of tank racking.

Is prevention better than having to chemically cure?

Providing juice low in polyphenol concentrations will provide a juice that is easier to clarify (fewer chemicals), quicker to cold settle (fewer energy cost for refrigeration) and fewer downstream issues as pinking (common in Sauvignon, Pinot Gris etc).

What is the cost associated with trying to inert a press tank? Many press manufacturers have pursued at some point the possibility of inert tank press processing, even central membrane press suppliers.

Most have concluded that the process is very costly, that the systems will need a buffer pressure gas tank, a nitrogen generator that feeds pure filtered inert gas contin uously in and needs to process the expelled gas.

The expelled inert gas is typically not reprocessed as the gas that comes from the press in practice would need to be re-purified before being re-introduced to the press tank.

The existing gas stream from the press is typically contaminated with sugar vapours, CO_2 from the natural-forming carbonic activity in grapes and other sulphurous gas products.

These gases, for the most part, would just complicate matters for the nitrogen generator filters.

It seems evident that inert gas blanketing of tank presses ultimately presents just another potential set of problems for the winemaker.

If a press cannot separate properly to begin with, or the press is too slow to drain, allowing juice to bind with the grape skins to form high concentrations of polyphenols, then the problem lies with the press design itself.

All this talk of inert tank pressing is literally smoke and mirrors.

All the techno-babble aside, it sounds like it's time to check out some of the old school press technologies such as central membrane presses that have been around, tried and tested for many years. ■